JUL 14 1949

The IRON AGE

JULY 14, 1949

As the white outline indicates, a standard unit of much greater frame size would be required to do the work of Speedaire.

Photo by courtesy of James Graham Mfg. Co., Newark, Calif., manufacturer of Wedgewood ranges.

Each SPEEDAIRE unit saved $243

THE Speedaire shown here is operating a pebble mill, grinding enamel for use in the manufacture of kitchen ranges—one of two such installations at this plant.

This job would have required a conventional worm gear drive nearly three times as large as Speedaire, weighing more than twice as much. By installing the smaller, more powerful speed reducer, the company saved $243 per unit.

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The IRON AGE

Vol. 164, No. 2 July 14, 1949

Rolling Steel DOORS

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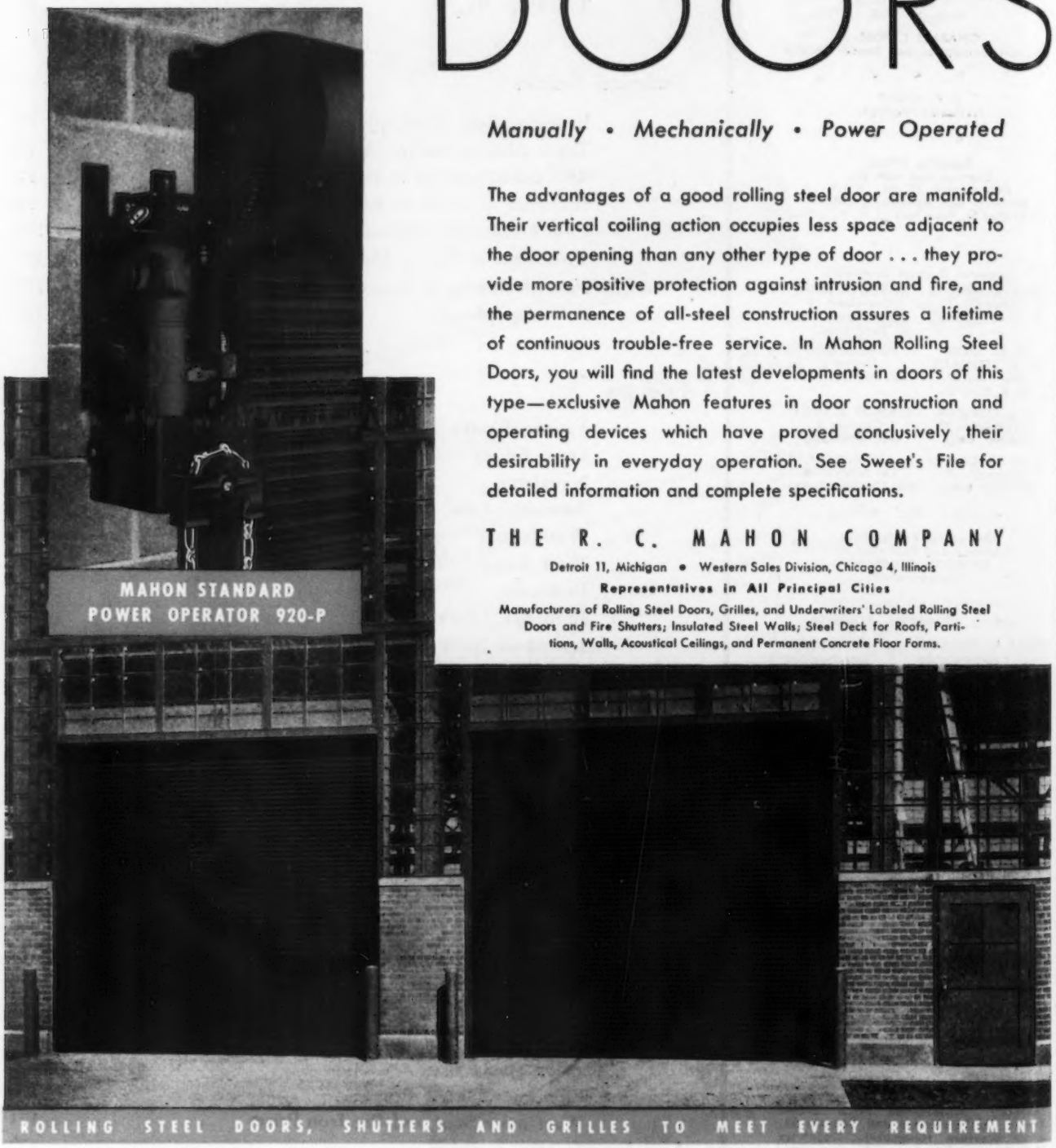

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July 14, 1949

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The Price Tag

"WHO wouldn't be in favor of a plan that lowers the cost of food to the consumer, raises the price which the farmer gets and costs the taxpayer nothing?"

The speaker is a member of the President's Cabinet (not Brannan). The question: "What do you think of the Brannan plan?" The occasion: A private dinner party at which all the guests agreed in advance to let their hair down—in confidence. There was a twinkle in the eye of the speaker and he was obviously exercising an honored guest's prerogative of ducking a question that was too hot to handle even within the bosom of a private gathering where everything was off the record.

The bread baskets of the world are filled again. A bumper crop of wheat is coming up in this country. Last year's great corn crop will soon come to market in the form of unprecedented quantities of ham and bacon. Ordinarily this would assure the consumer lower prices for food. It would also discourage bumper crops.

However, this is not an ordinary world for the consumer, the farmer or the taxpayer. The Brannan Plan is the politician's answer to a farmer's prayer—top prices for maximum production. And all this without pain to the consumer.

The Brannan Plan uses the concept of income parity and attempts to assure the farmer the same proportion of the national income as he enjoyed during the war and postwar period—years of unprecedented prosperity. It proposes to accomplish this by letting the farmer sell his perishable produce at the market and compensating him for the difference between his proceeds and the income which he might have realized under war conditions. Non-perishable crops will be supported by a new set of farm props—guaranteed to be better than the old.

One detail of this plan is still comfortably vague—the cost. No estimate of the total bill has yet been submitted to the American people. It is proposed that the new plan be tried out on hogs. Let them find their own level in the market and then pay the farmer the difference between what he gets and the support price. Mark W. Pickell, representing the Corn Belt Livestock Feeders Association, believes the "cost could run well over a billion dollars, and might come to two billion dollars."

It is a measure of the distance traversed during the last generation that a scheme of this kind should receive serious consideration and constitute the official farm program of the party in power. No layman can be so illiterate economically as not to realize that there is something malodorous about this beautiful scheme. Either the taxpayer must pay the bill or the government must create additional folding money with which to meet the charges.

To add this load for such a purpose to the burden already carried by the taxpayer would be mass larceny. To tap the credit of the government for this charge would be inflationary. When the money of all the citizens is depreciated for the benefit of some of the citizens we have mass cheating.

Joseph Stagg Lawrence

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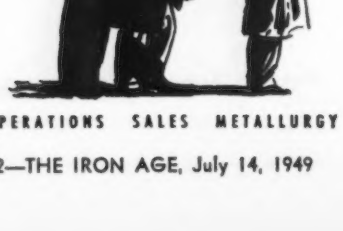


. . . and This "Inland Team" Gives Your Steel Their Personal Attention

OPERATIONS SALES METALLURGY

► Construction of the proposed 60,000-ton press for the Air Force has been deferred for the time being. Three basic designs for the huge press were submitted, but further studies will be made on captured German press equipment before a final decision will be made. The big press was proposed to top the capacity of one captured in Germany by the Russians and now reported to be operating in a Soviet aircraft factory.

► Transformation of a low carbon steel into a medium or high carbon steel after fabrication—oftentimes during the final step of heating for hardening—is made possible by a process called homogeneous carburizing. Adaptable to either batch or continuous furnaces, the through-carburization technique has been economically employed in treating steel up to 1/8 in. in thickness.

► Perhaps the most topsy-turvy aspect of the steel situation is the fact that distressed ingots (made for conversion deals) can now be had at a price that will permit converting them into sheets at less than current mill prices. At least one auto plant is taking advantage of this, although it won't last long and doesn't involve enough tonnage to threaten steel prices.

► There is no relief in sight for the new crop of warehousemen who stocked up on gray market steel at 7¢ or 8¢ a lb and are now trying to unload it for what it will bring. Many may go to the wall in the face of competition from old-line jobbers who bought their steel directly from mills at less than half the gray market prices.

► Pig iron has recently arrived at New England and eastern Pennsylvania points from India and Europe. While it has been delivered for $1.00 to $2.00 a ton less than the cost from domestic furnaces the trade may slack off now. Importers and consumers are getting wary of making commitments because of the delivery time involved and they don't know when domestic iron prices may be cut, nor by how much.

► The man who buys a "torpedo" or streamlined car may soon find it out of date. Chevrolet's bustle-back model, the Styleline, is forging ahead of its less expensive Fleetline, or smooth-back edition. Last year the Fleetline was far ahead of its notched-back brother.

► A parabolic radar antenna 50 ft in diam will be built for the Navy in 28 cast aluminum sections. Each section will weigh a ton. After assembly the antenna will be machined as a unit. Patterns are scheduled for completion in September and delivery of the unit is slated for the fall of 1950.

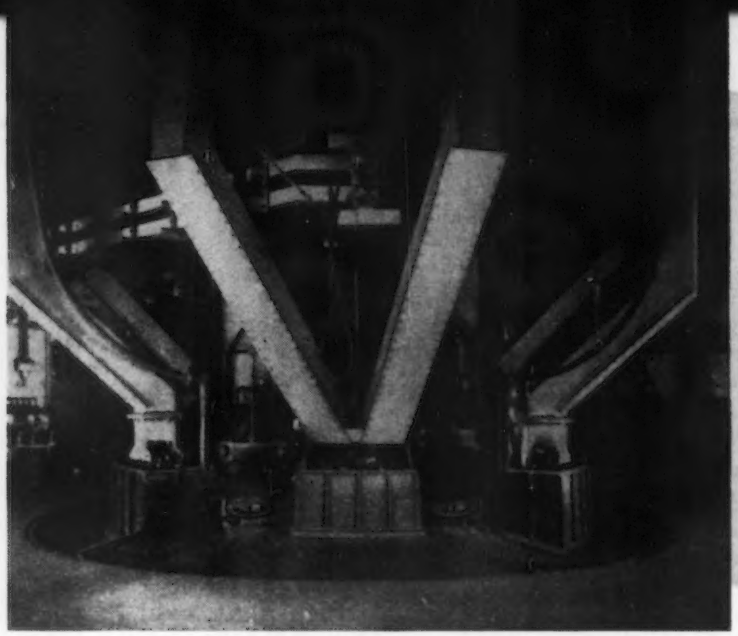
► The conveyor belt field, recently invaded by stainless and high strength-low alloy steels, has another aspirant. Porcelain enameled conveyor belt slats have given a good account of themselves under corrosive and moderately high temperature conditions.

► Washington economists predict an expansion in tractor demand from the current 300,000 to 400,000 units a year by 1952. They believe a lot of buying has been deferred, partly because of price, and set 1952 replacement needs alone at 180,000 units.

► Although producers of line pipe for the gas and oil industries have schedules that generally look like 2 or 3 year's work, they have been developing some flexibility in the past few months. Shipment of as much as 40,000 tons on a new order has been promised for delivery within a year.

► More highway construction dollars are going into steel. Use of steel has risen more than 50 tons per $1 million expenditure within the past 2 years. Bridge steel will be a major future need. In a recent survey of some 10,000 bridges, the Public Roads Administration found that 9500 were inadequate for modern traffic loads.

► Experimental work is being done to determine the practicability of using a liquid instead of a metal punch to produce blanks from silicon sheet steel. With this method a column of oil is substituted for the conventional punch and the die can be used in the unhardened condition. For each particular size and thickness of steel, it is necessary to calculate the particular impulse force to achieve a satisfactory blank.



FURNACE platform of a 7500 kva low shaft electric pig iron (Tysland-Hole) furnace. Due to its low height, the furnace is much less dependent on the strength of fuel than is the blast furnace. Photo courtesy Elektrokemisk A.S., Oslo.

By MAGNUS TIGERSCHIOLD

Director of Research
Swedish Iron and Steel Institute,
Stockholm, Sweden

Reducing Coke Consumption

IT is stated that of the world's coal resources, one-third can be used for the production of coke. In most of the great industrial countries, however, the best coal for this purpose has become more and more scarce and this depletion of the best coking coal has been fully recognized as a serious problem. As the blast furnace is the dominating consumer of coke, it is highly justified to make every possible effort to reduce coke consumption in the production of pig iron, or to find ways to use coke of inferior quality or other fuels for the reduction of iron ores.

It probably is a unique occurrence that a method like the blast furnace process, invented more than 500 years ago, is still working on unchanged principles. The reason is that this method is scientifically sound and that it has been possible to develop the originally small and ineffective furnaces into gigantic units of high efficiency. This development no doubt is one of the greatest achievements of modern engineering science. The United States and Germany have been the leading countries in blast furnace construction, not only in developing the profile of the furnace and charging devices but also in mastering transportation problems of flow of raw material into the furnace.

In the United States the result is the "1500-ton a day" blast furnace constructed mainly for the use of Mesabi ores. Total height of this furnace often exceeds 105 ft and the effective volume 45,000 cu ft. While the steady increase of furnace volume has resulted in higher production and thus reduced capital, labor and overhead costs per ton of pig iron, coke consumption did not drop, and due to its great height this furnace is more sensitive to coke quality than earlier constructions. A comprehensive report on American blast furnace practice has been made by Ess,[1] and Wesemann[2] recently published an interesting paper on investigations of German blast furnaces.

The most important factors effecting a low coke consumption in the blast furnace are: (1) High iron and low silica content of the ore; (2) good reducibility of the ore; (3) appropriate distribution of ore and coke when charged in the blast furnace, leading to an effective preheating of the burden and a high percentage of indirect reduction, and (4) highest possible blast temperature.

The influence of blast temperature on coke consumption has been well recognized. The maximum temperature that can be used is, however, dependent to a large extent upon the character of the ore burden. The Mesabi ores, for example, cannot be smelted at a higher blast temperature

This article was prepared as a contribution to the United Nations Scientific Conference on the Conservation and Utilization of Resources to be held at Lake Success Aug. 17 to Sept. 6. It is published here with the cooperation of the UN.—Ed.

The gradual exhaustion of the rich Mesabi ore sources and the depletion of good coking coal resources will, in the near future, pose many new and difficult technological problems for the American iron and steel industry. The solution to some of these problems may well lie in the experience of Swedish iron and steelmakers who have already been forced to face and overcome kindred obstacles. The author of this report appraises these accomplishments in terms of reducing coke consumption and presents data on Swedish coke use in blast furnace operations not previously published. The role of beneficiating, sintering, high top pressures, oxygen enriched blast, electric smelting and sponge iron in this fuel problem is also authoritatively weighed by the author.

In Iron and Steel Production

than about 1000°F. If the temperature is raised, serious trouble in the form of hangings will occur. Other ores, such as sintered Swedish magnetites, can advantageously be smelted at a blast temperature of 1470°F.

Within certain limits, preheating and indirect reduction in the blast furnace can be influenced by a well balanced production, according to furnace dimensions. Probably the most beneficial effect of the high top pressure method is better heat transfer from blast furnace gas to burden, which simultaneously results in a higher indirect reduction.

Of still greater importance is quality and treatment of the ore burden. In the author's opinion this factor has not been sufficiently recognized in a majority of the large steel-producing countries. In Sweden, however, where fuel is very expensive, different lines have been followed in the development of blast furnace practice and construction. Until the beginning of this century, charcoal was used exclusively as a blast furnace fuel in Sweden. More than 30 pct of the Swedish pig iron produced is still made in charcoal blast furnaces, and the constantly rising price of charcoal has necessitated strenuous efforts to reduce fuel consumption.

Swedish ore resources consist mainly of dense magnetites. It was recognized, formerly, that a preceding oxidizing roasting of the magnetite ore contributed to a lower consumption of charcoal in the blast furnace. In roasting, the magnetite is more or less completely transformed from Fe_3O_4 into Fe_2O_3. It is well-known that Fe_2O_3 at a low temperature is reduced to Fe_3O_4 by blast furnace gas. Thus a microporosity is obtained, and the magnetite so treated will become more easily reducible than natural magnetite. During roasting the magnetite is further changed by development of the fine cracks in the ore lumps. The question whether the cracking or the microporosity has the greater effect should be investigated. It was recognized at an early stage that roasting temperature should be kept below the point where iron silicates are formed.

These experiences have been of utmost value to Swedish blast furnace engineers. Today nearly 100 pct of the ore burden in Swedish furnaces consists of concentrates in sintered form. In the sintering process, a porous, but strong product, consisting mainly of Fe_2O_3, is desired. Sinter is currently regularly produced in Sweden with a degree of oxidation as high as 98 pct. This means that 98 pct of the iron in the sinter appears as Fe_2O_3. A paper on this subject was written by Hessle,[3] who made an investigation of the production of highly oxidized sinter at Hofors in Sweden.

As mentioned above, practically all Swedish blast furnaces are now using 100 pct sintered rich ore in the burden, resulting in a saving of 30 pct and more in the consumption of charcoal in a

charcoal blast furnace. When producing pig iron with about 1 pct Si and 1 pct Mn, the charcoal consumption calculated as coke is brought below 1200 lb per short ton.

Swedish Coke Blast Furnace Practice

Today nearly all Swedish pig iron for ordinary steel is produced in coke blast furnaces. For quality steel production, charcoal pig iron is used exclusively, and about 30 pct is still made in charcoal blast furnaces. The finest work in this field has been made at Domnarfvet where the use of 100 pct sinter was started in 1934. This, among other measures, has led to extremely low coke consumption, which probably can be indicated as a world record. The furnaces are only 56 ft high, and though during recent years the hearth, bosh and top diameter have been appreciably enlarged, no alteration of furnace height has been made.

Fig. 1 shows the production per day per furnace, as well as consumption of coke, ore and lime from 1925 to 1948. During the period Thomas iron (basic bessemer) was produced with 0.2 to 0.5 Si, 0.8 to 1.0 Mn, 1.8 to 2.0 P and 0.03 to 0.05 S. Coke consumption until 1932 was about 2070 to 2150 lb per short ton, the average being about 2120 lb. The ore burden at that time consisted of lump ore only, of which the Grangesberg ore represented about 50 pct. Consumption of ore per ton of pig iron was about 3660 lb per short ton, and the limestone addition 732 lb per short ton.

Coke consumption is taken as weighed to the furnace at charging; no deduction has been made according to the content of moisture or ash in the coke.

A sintering plant of the Greenewalt type was completed in 1934, which made it possible to use 95 pct sinter made from rich concentrates. Of the ore burden, 5 pct was still in the lump state and consisted of an iron ore high in manganese and of some slag from the Thomas converters. The ore burden dropped to about 3300 lb per short ton of pig iron, and the limestone that was still charged as lumps could be lowered to 300 lb per short ton of pig iron.

Through these steps coke consumption dropped to 1400 lb per short ton, on which level it was kept from 1935 to 1942. Early in 1934, before the starting of the sintering plant, coke consumption had been brought down to 1740 lb per short ton by using a richer lump ore in the burden and by redesigning the furnaces. Among other alterations the hearth diameter was enlarged.

At the beginning of 1943 so-called lime sinter was introduced, with limestone finely crushed and mixed with ore concentrate, before sintering. After some preliminary experiments it was possible to add all the necessary limestone in this way.

A further improvement of blast furnace performance was achieved in 1944 when all the manganese-bearing lump ore was finely crushed and mixed with the concentrates before sintering. Since then, for almost 5 years, the blast furnaces have been operated with an ore and limestone burden consisting exclusively of sinter with a composition accommodated to the pig iron analysis and the slag composition wanted. Through this alteration coke consumption dropped to 1300 to 1360 lb. Due to inferior coke with high water content the consumption increased somewhat during 1944-45, but as soon as better coke was available it dropped to an average value of 1300 lb per short ton.

Owing to the low height of the blast furnaces no difficulties or decreases in pig iron production occurred when inferior coke was used. Only occasionally has the iron content of the burden been somewhat higher than in earlier years when sinter and limestone in lump form was used. Consequently, the latest decrease in coke consumption is not caused by a richer burden.

The blast temperature is now about 1470°F. It has varied somewhat during different periods, but its influence on coke consumption has proved to be less than the influence of other measures. Much care has been taken in producing a sinter containing as little FeO as possible. When limestone was mixed with the ore before sintering, oxidation of the sinter increased from 94 to 95.5 pct to 96 to 97 pct (this means that now 96 to 97 pct of the iron in the sinter appears as Fe_2O_3). A still higher value, about 98 pct oxidation, has now been obtained by using finely ground coke breeze ($\frac{1}{8}$ in. max) for the sintering. Consumption of coke breeze, due to the use of finely ground material, is as low as 100 lb per short ton of sinter even though limestone is added to the concentrates before sintering.

After introducing the more easily reducible lime sinter, production of the blast furnaces was raised from an average of about 174 to some 220 short tons per day. These figures are extremely low when compared with American practice, but the working volume of the furnaces is only 4944 cu ft and the hearth area as small as 80 sq ft. This means a production per unit of working volume of 44.5 short tons per 1000 cu ft. This figure is about 50 pct higher than obtained in American blast furnaces.

The present results are due to improvements made at the concentrating plant, by which the percentage of SiO_2 in the ore has dropped, making it possible to use less limestone in the burden. At present the concentrate contains about 63 pct Fe and 5 pct SiO_2. The lime sinter (including lime, manganese ore and some Thomas slag) contains 54 pct Fe. Slag volume consequently is very low being about 860 lb per short ton of pig iron.

The air blown is 11,600 cu ft per min as measured, while the calculated volume is only 8500 cu ft. The CO_2 content in the blast furnace gas was 9 to 11 pct when lump ores were used. When sinter was first introduced, the CO_2 content rose to 13 to 15 pct and is now, when lime sinter is used, 15 to 17 pct in spite of the fact that in this case no CO_2 is formed from the limestone which is already calcined in the sintering pan. The $CO:CO_2$ ratio is as low as 1.4 and the heat value of the blast furnace gas has dropped to 77.5 Btu per cu ft. The volume of blast furnace gas is about 78,000 cu ft per short ton and the top temperature is about 480°F. No water is added at the top of the furnace.

The furnaces are provided with single Parry bells and cones. Much care is taken to attain an

appropriate distribution of sinter and coke. This important factor has also been studied thoroughly at other blast furnaces in Sweden. In spite of the high production per unit of working volume, the dust losses are not higher than 40 to 80 lb per short ton of pig iron produced.

The author is indebted to the management of Domnarfvet for the permission to publish, for the first time, these really interesting results.

At Fagersta where 59-ft high charcoal blast furnaces have been rebuilt into coke blast furnaces, a corresponding development has taken place. When producing pig iron for openhearth furnaces with about 1.2 pct Si and 1 pct Mn, coke consumption has been brought down to about 1400 lb per short ton of pig iron.

The prime reason for the good results achieved in Sweden is the fact that excellent resources of magnetite ore can be beneficiated economically to rich concentrates which can be transformed into an easily reducible sinter. Another advantage is that this sinter allows the use of a high blast temperature. Similar conditions exist in only a very few districts of the world, but the pioneering work done in Sweden has shown ways and means which, if they were more generally adopted, no doubt would result in an appreciable saving of coke at many blast furnace plants.

When in the future the American blast furnaces have to change their ore burden from the present Mesabi ores with about 51 pct Fe to rich concentrates with 62 pct or more Fe made from taconites, the results obtained in Sweden probably will be of still greater interest. It might be found that the present gigantic blast furnaces in the United States could be cut down to a lower height, enabling the use of inferior coke.

Pelletizing Process Holds Promise

The pelletizing process, which at present is being investigated in the United States, will probably be of great importance. In Sweden interesting experiments are also being carried out on this process, which seems to be especially suitable for the treatment of Swedish magnetite concentrates. Through this method it is possible to obtain a regularly sized ore burden, which no doubt will result in a more regular blast furnace performance.

The effect of sized and nodulized Mesabi iron ores on blast furnace performance has been shown by large-scale experiments at the Edgar Thomson works. As far as can be judged by the report by Dobscha,[4] the agglomerates used were not ideal. The fact that the density was higher in nodulized ores than in the unprepared material shows that the temperature in the rotary kiln was kept so high that considerable formation of iron silicate probably took place.

Of interest also are the experiments made in recent years at Cleveland and Youngstown with the so-called high top pressure furnace.[5, 6] An appreciable saving of coke and a higher production has been attained. This method offers an advantageous possibility, especially in places where fine ores are used. Dust losses are reduced appreciably, but it might turn out that still more can be attained by combining a high top pressure and a sized and sintered ore burden.

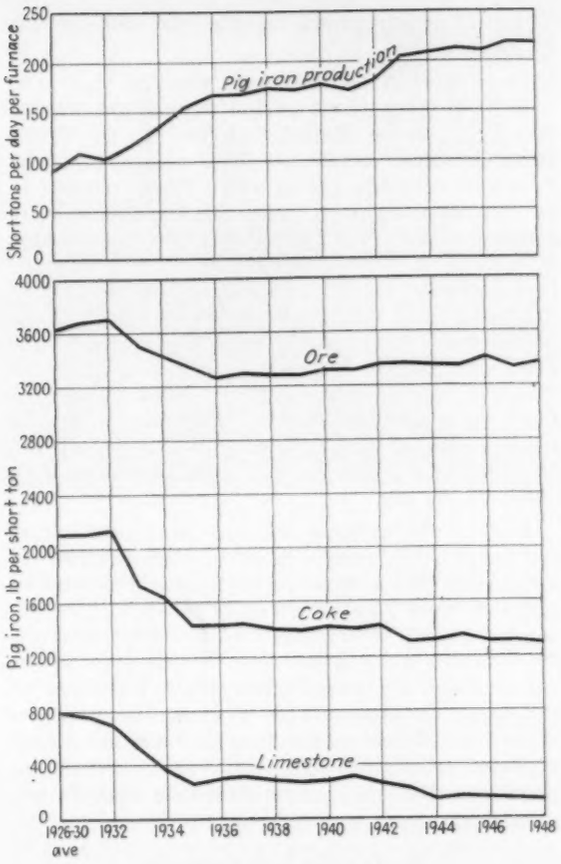


FIG. 1—Experience in Sweden in reducing coke consumption is illustrated in these curves which compare trends in pig iron production with trends in use of coke, ore and limestone.

Among other developments the excellent work by Brassert should be mentioned. At Corby in England and at the Hermann-Goring works in Germany he introduced a method of melting poor silicious ores with a low lime addition. Desulfurization of the pig iron is not as good as in ordinary practice, but by treating the iron with soda ash in the ladle, sulfur can be brought down to a sufficiently low figure. If these ores were melted with a basic slag of usual composition, coke consumption would be prohibitive. This method is a valuable contribution to the utilization of low-grade silicious ores.

The world's blast furnace engineers are awaiting the results from the large-scale experiments with oxygen-enriched air at the blast furnaces of the Bethlehem Steel Co. and at the Weirton Steel Co., Johnstown, Pa. As suggested by Old and collaborators,[7] the results might show that a combination of high top pressure and oxygen-enriched air will be an interesting solution for further development.

The temperamental and somewhat choleric Professor Wust once called the blast furnace "a lazy nuisance." Now Prof. Durrer of Switzerland[8, 9] has taken up this challenge against the classical process. His suggestion is a low shaft furnace operated with nearly pure oxygen instead of air. The furnace can be regarded as a gas producer making an excellent fuel gas from

a cheap fuel and producing pig iron more or less as a byproduct.

It is interesting that a furnace of this type was tried for a short period during the war at the Suddeutsche Kalkstickstoffwerke in Trostberg, Bavaria,[10] where pig iron was successfully produced with the use of 40 to 42 pct oxygen in the unpreheated blast. Some 2800 lb of coke were consumed per ton of pig iron, but the thermic value of the gas was measured at 147 Btu per cu ft. Thus far only crushed and screened coke has been tried, the size being 5/8 to 1½ in. Probably a certain amount of coke breeze could have been admixed, and there is no reason why anthracite or non-coking coal could not be used, at least to a certain extent. Probably a higher oxygen content in the blast would prove advantageous, thus resulting in a still higher calorific value of the gas.

Even if this process could be used to a limited extent only, it surely is of enough interest to emphasize that systematic tests should be carried out at a steel plant as soon as possible. According to verbal communication from Prof. Durrer, he now has a small furnace of this type under construction at Gerlafingen, which will soon be put into operation. This process offers an interesting solution of the fuel problem for an integrated steel plant and should be of special interest in countries where first-rate coke is not available.

Electric Pig Iron Furnaces

In countries where fuel is expensive but electric power is available at low prices, the electric pig iron furnace offers an advantageous solution. In 1928, after many years of experiments, a low shaft electric pig iron furnace (the Tysland-Hole furnace) of industrial size was put in action at the Cristiania Spigerverk, a steel plant near Oslo. A pig iron furnace of similar type has been constructed by Siemens.

Altogether 25 Tysland-Hole and a few Siemens furnaces have been installed and several new furnaces are under construction. Due to the low height of the furnace, it is much less dependent on the strength of fuel than is the blast furnace. An ideal fuel is 50 pct coke and 50 pct coke breeze, but charcoal, lignite, peat coke, and anthracite can also be used as additional fuels in mixture with coke.

About 800 lb of coke is needed for producing 1 short ton of pig iron. Consumption of electric power is about 2180 to 2365 kw-hr per short ton, depending on the quality of ore used and on the analysis of pig iron produced. Maximum capacity of furnaces hitherto in operation is about 110 short tons of pig iron per day, but a 200-ton unit is under construction for the new government steel plant in Norway. For a 100-ton unit the transformer capacity is about 12,000 kva (50 cycles), while for a 200-ton unit the transformer capacity is 24,000 kva (25 cycles). The construction of the furnace and its operation is described in various reports.[11, 12, 13]

In order to decide if in a certain district an electric pig iron furnace should be built instead of a coke blast furnace, the following views should be kept in mind.

Advantages:

(1) The electric pig iron furnace is remarkably insensitive to the quality of raw materials used, especially of the reducing agent. This implies that in many countries domestic sources of fuels not suitable for the blast furnace may be used for producing pig iron electrically.

(2) Due to excellent desulfurization, good pig iron can be produced in electric pig iron furnaces from raw materials of inferior quality.

(3) The furnace can be run at half capacity and thus serve as a consumer of peak loads and occasional surplus power. As an example, at one steel plant the electric pig iron furnace, during short periods of power shortage, was operated during weekends only.

(4) The electric pig iron furnace gas is not diluted with nitrogen and thus is much richer than blast furnace gas. The calorific value is approximately 290 Btu per cu ft. The quantity of gas formed is about 23,000 cu ft per ton of pig iron. It is an excellent fuel gas and it can also be used for chemical synthesis, production of hydrogen, etc.

Disadvantages:

(1) As the maximum capacity of the electric pig iron furnace probably cannot be raised above 200 tons a day, the erection costs per ton of the annual production will be somewhat higher than for a coke blast furnace of modern size.

(2) Operating costs with regard to manpower and repair costs are somewhat higher than for a coke blast furnace.

(3) Due to the rather high consumption of electric power, the economy of the electric pig iron furnace is largely dependent on the price of electricity.

Already, in its present state, the electric pig iron furnace offers an interesting possibility for reducing coke consumption for pig iron production. Promising experiments are now running in Sweden with pre-reduced ore for the furnace. This method was developed by Wiberg, and thorough calculations show that it should be possible to save 20 to 30 pct in coke and power and at the same time raise production appreciably. All gas formed will be used for the pre-reduction furnace, and it is a matter of local conditions if the savings made will balance the value of the gas thus not available for other purposes.

Sponge Iron Processes

The possibility of producing a low carbon iron directly from ore has been the subject of much research and many expensive experiments. In most of the proposed processes the ore is reduced at a temperature well below its melting point. The product thus obtained is called sponge iron and consists of a porous mass of more or less completely reduced iron. The gangue of the original ore remains in the product. It is therefore always of great importance to use the richest possible ore as raw material for sponge iron production. This is especially the case when the product is used for the manufacture of iron powder, but it is of importance also when the product is used as raw material in steelmaking furnaces.

Powder metallurgy is a new and interesting

BLAST furnaces at Domnarfvet. Use of 100 pct sinter has resulted in extremely low coke consumption.

possibility for the mass production of small complicated parts of iron. The use of this material probably will increase appreciably, but the tonnage will no doubt remain limited.

There is a possibility that sponge iron in large quantities will be used as melting stock, i.e., as substitute for scrap and pig iron or together with pig iron for the production of quality steel. Commercial scrap has become more and more contaminated by impurities—copper, nickel, and tin being the most dangerous.

By extensive experiments it has been shown[14, 15] that sponge iron can be used only as raw material in electric steel furnaces, and also, if certain measures are taken, as a substitute for scrap and pig iron in open-hearth furnaces. In acid furnaces successful trials have been made with 70 pct sponge iron and 30 pct domestic scrap.[16] In basic open-hearth furnaces, however, the addition of sponge iron probably must be kept lower.

It can hardly be predicted that sponge iron will be used to a larger extent for the production of commercial steel in the large steelproducing countries. If sponge iron could replace commercial scrap in the production of quality steel, a corresponding amount of scrap would be available for the production of commercial steel, thus reducing the quantity of pig iron necessary for maintaining production. Development of sponge iron processes thus could contribute to a lower consumption of coke for the entire steel industry.

Regarding the production of sponge iron for melting stock, only two processes have thus far been in industrial operation. Both were invented and operated in Sweden.

The Hoganas process invented by Sieurin has been in regular operation since 1911 at Hoganas, a ceramic factory in the south of Sweden. Its principle is well-known from technical literature,[17] and much work has been done in the United States and in Canada[18, 19] for the further development of this process.

At Hoganas rich iron concentrates are packed into ceramic saggers in layers with coke breeze mixed with limestone. The saggers are heated in a ring furnace of the same type as is frequently used for burning bricks. The maximum temperature of the furnace is 2192°F. To obtain a high degree of reduction the saggers must be kept in the furnace for an appreciable time, about 8 days. The sponge iron produced is obtained in porous cakes of regular form, with a density of 2. Due to the addition of lime, no sulfur contamination occurs, and in some cases even a reduction of the sulfur content takes place.

The greatest part of the heat necessary is evaluated by burning the carbon monoxide formed at the reduction of the iron ore, but some extra heat is needed and is attained by an additional combustion of ordinary producer gas. A surplus of coke breeze must be charged to the saggers to prevent reoxidation of the product. Most of the surplus, however, can be recovered and used again. The consumption of coke breeze can thus be kept below 1400 lb per short ton of sponge iron. The extra heat needed amounts to only a few percent of the total consumption.

As all the heat necessary for the reduction is conducted to the charge through the sagger walls, the production largely depends on the conductivity of the sagger material and of the charge as well as of the total heat exposed area of the saggers. According to Eketorp,[17] the furnace at Hoganas holds 35,000 saggers. Furnace volume is about 106,000 cu ft, of which about 88,500 cu ft is effective volume. The total heat exposed area of the saggers is about 188,300 sq ft. With a daily production of 77.5 short tons only 0.83 lb of sponge iron are produced per day per sq ft of sagger area, while 1.7 lb are produced per day per cu ft of effective furnace volume. From the latter figure it is obvious how expensive the construction of a sponge iron plant of this type must be.

The raw material used at Hoganas is an extremely rich and pure iron concentrate from the Lappland mines containing 71.5 pct Fe, and thus the sponge iron produced contains more than 97 pct Fe. The degree of reduction usually exceeds 96 pct which means a remaining oxygen content of about 1 pct in the form of FeO. The content of gangue usually is about 1.6 pct, and the carbon runs as low as 0.1 pct. The product has mainly been used as melting stock at Swedish quality steel plants, and in spite of the fact that the production never has exceeded 25,000 tons per year, this product has been of considerable value for the Swedish steel industry. In recent

years an increasing part of the production has been used for the manufacture of iron powder. After grinding, the powder has been subjected to magnetic separation and to an additional reduction, thus forming a product with a very low content of gangue and oxygen.

Of great interest is the Wiberg process which was invented in 1918.[20, 21] In this method the ore is treated and reduced in a continuous shaft furnace. The reducing agent is a hot gas consisting of about 70 pct CO and 25 pct H_2. The gas is formed by circulating a part of the waste gases from the zone for final reduction through an electrically heated carbureter, where CO_2 and H_2O are reduced with carbon to CO and H_2. In this process the ore must be in coarse shape, a suitable burden being sized lump ore or sinter.

The Wiberg process has been running continuously for more than 8 years at Soderfors, and two more plants of larger size will be built in the near future by other Swedish steel companies.

At the beginning the carbureter was constructed for the use of charcoal, but recently successful experiments have been carried out with coke as fuel. Sulfur in the gas can be completely removed in a lime or dolomite filter placed between the carbureter and the furnace.

Much work has also been done to enable the use of pellets instead of sinter in the Wiberg process. The results, so far, are promising but not final. The Wiberg process is built upon theoretically sound principles, and the consumption of heat is the lowest ever obtained in industrial operation at the reduction of iron ore. Per short ton of reduced iron the coke consumption is about 500 lb and the consumption of power is about 1000 kw-hr.

The difficulty of building the Wiberg furnace in large units might limit the use of the process. The furnace at Soderfors is producing 10,000 tons a year, but new furnaces now under construction will have a rated production of about 20,000 tons a year.

Another limitation might be the poor behavior of certain ores in the reduction. The ore used must not disintegrate nor have a tendency to stick at the reduction temperature.

In many cases it might be difficult to decide which sponge iron process should be used. A summary of the advantages and disadvantages might be helpful for this purpose.

The Hoganas process has the following advantages:

(1) Raw material can be any crushed ore of a size of less than ½ in. Experiments have been made using sized lump ore as raw material, and further experiments might show the possibility of using such a material. There are no limits as to minimum size of ore, and the process is remarkably insensitive to properties of ore used.

(2) Generally no sintering or other previous treatment of the fine ore other than drying is needed. No sulfur contamination takes place, and in certain cases desulfurization is accomplished.

(3) A high degree of reduction, about 96 pct, can be obtained. If iron silicates are present in the ore, the degree of reduction is lowered, (this holds true for any sponge iron process).

(4) Inexpensive fuel can be used for reduction and heating. At present mostly coke breeze is used for reduction, while the producer gas is generated from a low-grade coal.

(5) The finished product is obtained as cakes, which in spite of their porosity are remarkably strong and free from any tendency to form fines.

Disadvantages of this method are:

(1) Construction costs are high. Large furnace volume in comparison with production.

(2) Labor costs are rather high.

(3) Limited life of saggers is a weak point in the process.

The Wiberg process has the following advantages:

(1) Lump ores as well as sinter can be used. Sulfur content of the ore is reduced to a very low figure in the oxidizing zone in the upper part of the furnace.

(2) Heat consumption is remarkably low.

(3) Furnace is relatively inexpensive in construction.

(4) Process is continuous and well mechanized; consequently labor costs are very low.

The disadvantages are:

(1) Ore concentrates must be sintered before reduction and this process is more sensitive than is the Hoganas process to the properties of ore used.

(2) At present the process is limited to first-rate coke or charcoal as fuel.

(3) It will probably be difficult to build the furnace in large units.

When developing the Hoganas, as well as the Wiberg process, the general principles of heat economy have been observed. The waste gases consist of N_2, CO_2 and a certain amount of O_2 leaving the furnace at a low temperature. In the Wiberg process the thermodynamic laws of equilibrium have been well recognized and utilized in the construction and maintenance of the furnace.

The Hoganas, as well as the Wiberg process, can be improved. The former process could be more mechanized in order to decrease labor costs. A reconstruction of the furnace and a systematic research on the sagger problem are recommended.

It has not yet been tried, but apparently there are great possibilities in replacing the Wiberg carbureter by a gas producer for oxygen-enriched air. This would mean that no electricity for the heating of the furnace would be necessary. Kalling and Stalhed[21] point out that natural gas, coke oven gas, and even oil could be transformed into a suitable reducing gas for this purpose, and thus the coke consumption could be reduced to a still lower level.

Brassert and his collaborators are proposing a new sponge iron process, where the reduction should be made at elevated pressure. An oxygen gas producer might also be introduced in this system.

In judging the value of a sponge iron process, it should be kept in mind that the method must be theoretically sound and the construction as simple as possible. Processes giving a surplus gas and basing their economy on a favorable price of waste gases used for extraneous purposes sel-

dom can compete with processes utilizing self-generated heat.

When gaseous reduction is applied, it should be kept in mind that reduction with H_2 is highly endothermic while reduction with CO is exothermic. In manufacturing such an expensive product as iron powder, hydrogen alone could be used for reduction, which, for economical reasons would seem impossible for production of melting stock.

It is practically impossible to tell in advance how an ore will behave during reduction, and it is necessary to make large-scale experiments before taking up a sponge iron process.

The Krupp-Renn Method

The Krupp-Renn method was invented, between the two world wars, by Johannsen[22] in Germany. It is a direct process where the product consists of small lumps of iron obtained in a half melted form together with a slow-flowing slag. The furnace is a large rotary kiln heated with pulverized coal. Finely divided ore is fed into the furnace together with a sufficient amount of coke breeze or anthracite dust. The burden is successively preheated by the powdered coal flame and by the combustion of surplus coke and carbon monoxide formed by the reduction of the ore. The temperature is kept below the point where the iron is melted but high enough to obtain the slag in a slow-flowing state. The mass coming out of the furnace is cooled and crushed, and the small iron lumps are detached from the slag by a magnetic separator. The product is not very clean, the iron content being only about 95 pct and the sulfur very often running as high as 0.3 to 0.8 pct. The carbon usually is about 0.8 pct. A description of the process is given by Durrer,[8] and recent developments are reviewed by the author in a Swedish journal.[23]

The greatest advantage of the process is that poor, highly silicious ores and ores with high titanium content can be utilized and, to a great extent, low-grade fuel can be used. Total consumption of fuel is about 1300 to 2200 lb per short ton, depending on iron content in the ore burden. The process has been used to quite a large extent in Germany and Japan; in the latter country ten or more large furnaces were in operation during the last war.

Proper composition of the ore is essential, and very often additions must be made to produce a suitable slag. The temperature in the hottest zone must be kept within narrow limits, and it is difficult to prevent the sticky slag from forming rings on the furnace wall. Consumption of refractories is rather high, and thus the repair cost of the furnace is a heavy item. Building costs are also rather high. The product is used as melting stock in openhearth and electric furnaces, but the high sulfur content is a considerable limitation to wider application of the process.

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Taper

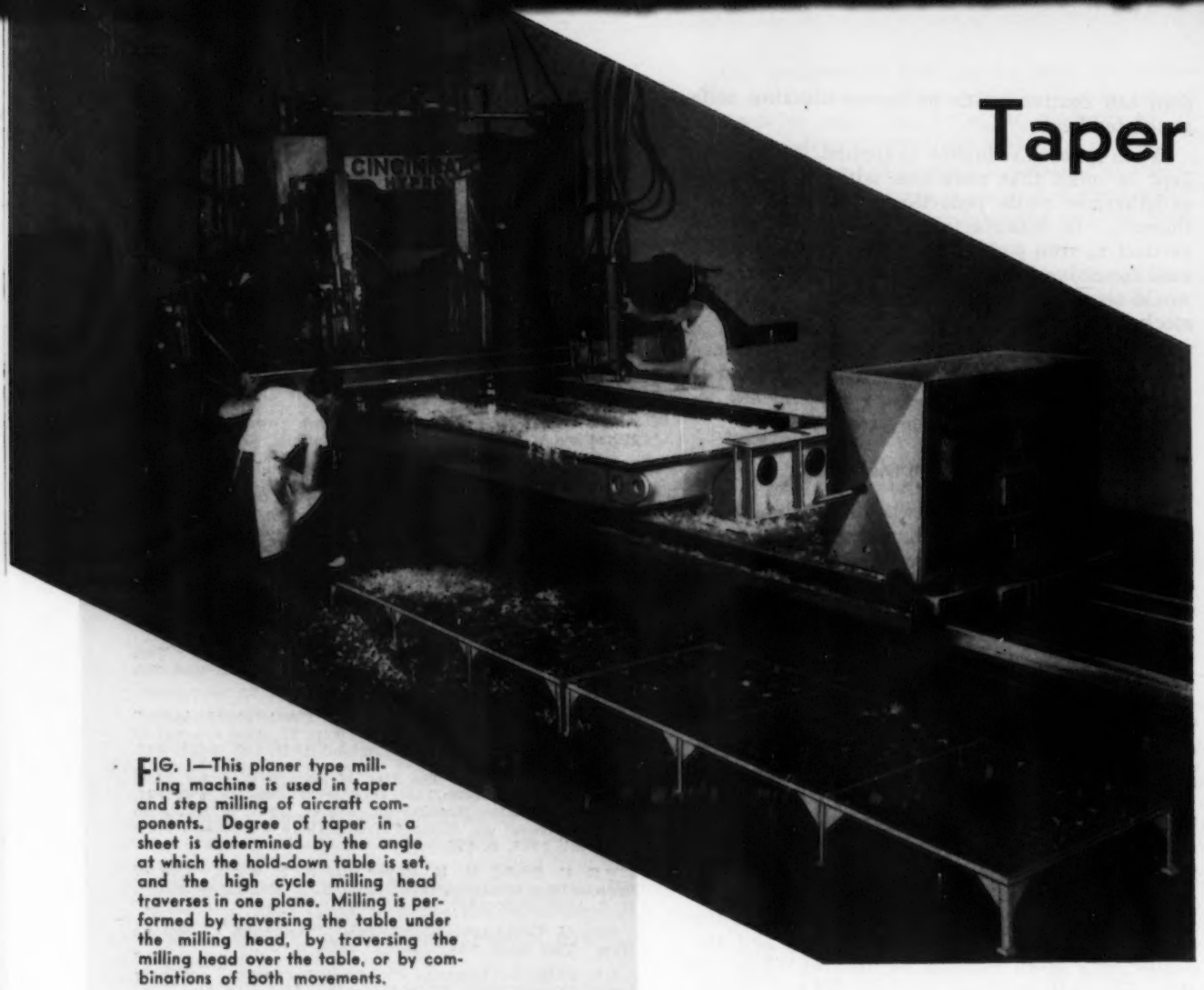

FIG. 1—This planer type milling machine is used in taper and step milling of aircraft components. Degree of taper in a sheet is determined by the angle at which the hold-down table is set, and the high cycle milling head traverses in one plane. Milling is performed by traversing the table under the milling head, by traversing the milling head over the table, or by combinations of both movements.

Taper or skin milling, developed for contouring wing skins for high speed aircraft, is now being used for step and taper milling of spar webs, fuselage skins, and other structural members requiring thick edges, steps, straight tapers or islands. Machining methods and design factors of tapered and stepped sections are described in this article.

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IN the competition among manufacturers to increase aircraft performance, weight reduction is primarily important. Among the latest techniques in airframe construction is the use of tapered and stepped metal sheets that save weight by distributing metal mass to required areas. North American Aviation has investigated methods of producing tapers on sheet metal, and is now using a technique of milling such forms.[1] The equipment involved, shown in fig. 1, consists of a planer-type milling machine, a high-cycle milling head, and a workpiece hold-down mechanism that clamps the sheet around the edges and holds it in position by evacuating the air from under it. The machine was designed by Cincinnati Planer Co., Cincinnati, Ohio.

Production of tapers in sheets falls into three categories: (1) Taper can be produced uniformly from one end of the sheet to the other by machining or by rolling; (2) thickness of the sheet can be reduced in steps of uniform thickness by machining only, and (3) both the tapered thickness and stepped thickness techniques can be combined. Machining of steps or

Milling Aircraft Parts • • •

tapers can usually be done in one setup of the machine and the hold-down plate, but combinations of step and taper may require two or more setups.

[1] *See "Milling Aircraft Wing Skins,"* THE IRON AGE, *May 5, 1949, p. 78.*

Tapered sheets are a relatively recent development. Aluminum alloy wing and fuselage skins, spar webs and other structural members can be machined in a variety of shapes with thick edges, steps, straight tapers or islands. The ease and speed of fabrication and assembly of tapered metal sheets compare favorably with conventional assemblies of multiple thickness skins and splices. Their first employment was as wing skins, but many other uses have been found. Weight comparisons will inevitably favor their employment for stress transfer members where load is of varying magnitude.

The amount of weight that can be removed by tapering is the important factor. Any sheet of aluminum alloy 48 x 114 in. that is tapered in thickness by 0.005 in. will be 1.7 lb lighter than a corresponding sheet of uniform thickness. When the thickness is tapered by 0.050 in., the reduction in weight will be 17 lb.

Fig. 2 shows a typical tapered wing skin produced by milling. Machining is accomplished either by traversing the carriage and its load lengthwise against the revolving cutter, or by moving the milling head on its own bridge crosswise to the length of the workpiece while the carriage remains stationary. Angular cuts may also be made by pacing the speed of the carriage movement to the crosswise travel of the milling head. Depth of cut is adjusted when the machine is not in operation.

The degree of taper produced results from positioning the hold-down plate, either flat for step-milling or tipped at an angle for uniform tapering. Short uniform tapers up to 12 in. long can be produced in conjunction with step-milling by tilting the milling head on its bridge. It is in the design of the type of taper that the greatest economies in tapered sheet milling can be effected.

The minimum size accommodated by the hold-down plate now in use is 48 x 130 in. and the maximum thickness and width that can be held flat by the machine is 0.625 x 48 in. The maximum length of sheet that will fit in the machine is 20 ft, and, while 130 in. is the maximum length of cut that may be taken, the piece may be shifted on the hold-down plate. Minimum thickness after milling is 0.020 in.

The tolerance on thickness after milling is ±0.005 in. However, the tolerances on the thickness of the sheet as received from the manufacturer are not strict and have more effect on both taper-milling and assembly than do milling the tolerances.

Insofar as possible, the design of the tapered skin is laid out with straight cuts parallel to or at 90° to the machine bed traverse. This simplifies machining and reduces costs. However, profile cuts and angular cuts may be made if the cuts are guided by a template and stylus, and, with infinitely variable speed ratio between cross travel and lengthwise travel, a cut in any direction may be made.

Blending of cuts is difficult in tapered skin

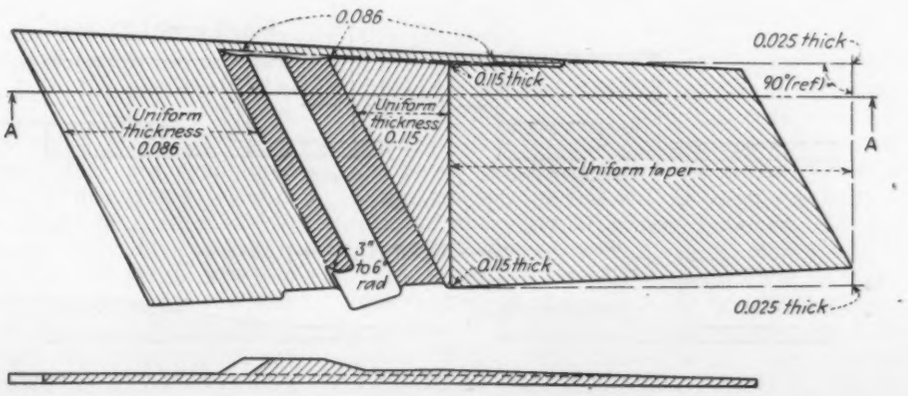

FIG. 2—This is a typical taper-milled wing skin. It contains areas of uniform taper, uniform thickness and has a raised area.

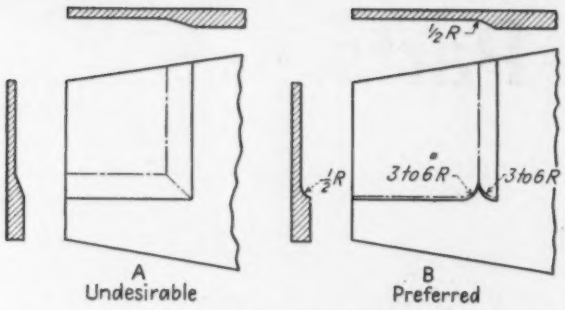

FIG. 3—The design at *A* is undesirable for blending tapers because at the plane of intersection of the tapers, hand work is required to finish the surrounding area. The design at *B* is the preferred type of inside corner blend.

milling. Certain internal corner cuts are attainable only with extreme care and skillful manipulation of the controls. Especially difficult is the blending of two plane cuts such as illustrated in fig. 3A. The preferred design is the blending of two radii or, as in fig. 3B, a radius and a plane cut.

The cutter radius found most suitable for internal corner cuts is ½ in. and cutters must be accurately ground to this radius. Although other radii could be used, a uniform radius is desirable to limit the number of setups required.

Fig. 3B shows 3 to 6 in. radius at the inside corner, the diameter of the circle prescribed by the flycutter. Smaller diameters require more passes over a given area to remove material. Diameters larger than 12 in. are at present impractical because of deflection of the cutter and difficulty in blending machine surfaces.

In milling a sheet that is stepped down in areas of uniform thickness, the hold-down table is flat and level and the stepped areas are connected preferably by cuts of ½ in. radius or short lengths of uniform taper. Fig. 4 shows correct and incorrect methods of dimensioning step lines. The thickness tolerances under which aluminum alloy sheet or plate stock is received from the manufacturer vary enough to make it difficult to hold improperly applied dimensions. The line of tangency of the cutter radius nearest the hold-down plate is preferred.

Because of the nature of the flycutting tool, machined sheets are not designed with a thick section completely surrounding a recessed area. The cutter cannot be lowered into the sheet to make such a recess, and must be permitted to start the cut from the edge.

Short tapers up to 12 in. long are specified by angle, since the milling head is set up by angle and the possibility of miscalculation from other methods by the setup operator is negative. Uniform taper in thickness over distances longer than 12 in. is given by thickness dimensions at the corners of the smallest rectangle that will encompass the tapered area, as in fig. 2. The hold-down plate is set up by level and height gage to these dimensions.

At present, taper-milled sheets are cut to outline after milling, and fabrication proceeds as in other metal parts. Holes are either drilled or pierced. Forming in a single plane curvature is done on a rolling machine or press brake, which sometimes requires a special punch contoured to fit the tapers and islands. Compound curves have been formed by stretching, as shown by the example in fig. 5. This part was stretched over a die for an engine cowl. Tapered sheets can be brake-formed into angles or channels and stretched to contour.

In stretch forming, the tendency is for the thinner portions to neck down and fracture before the rest of the sheet takes a permanent set. Much depends upon the shape of the part. By skillful manipulation of the stretch machine and dependence on friction between part and die, the thinner portions are formed first. As forming progresses the tension is increased and the friction helps to keep the part from splitting.

Clad aluminum alloy used for taper-milling stock will have the clad protection removed during milling and must be anodized. Warpage from machining of 75S-T6 alloy has not been a serious problem. Since the machining is done on the interior side of an airfoil or fuselage skin, warpage is generally in this direction and aids rather than hampers subsequent forming.

Advantages of taper-milled sheets are several. Weight is reduced through milling off much excess mass in the areas where not required. Splices between members of different thickness are eliminated, saving assembly time and weight on splice plates and fasteners. The saving in cost of fasteners alone is an important economy item. Edges of sheets may be left thick, thereby increasing the bearing strength for attachment and reducing the number of

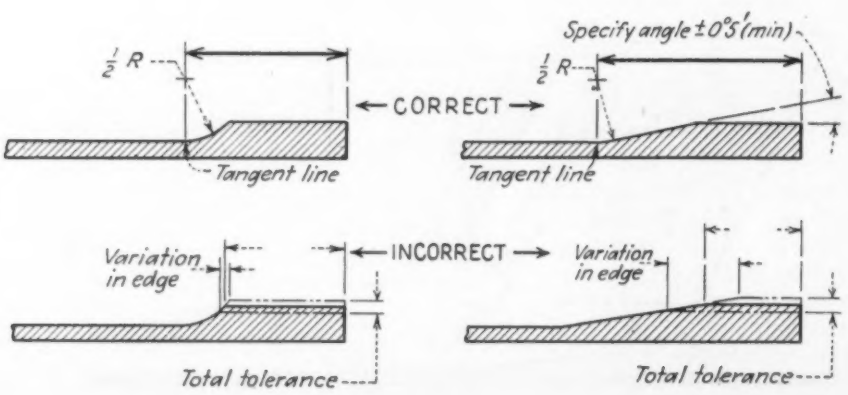

FIG. 4 — Correct and incorrect methods of dimensioning step lines are illustrated here. The lower examples are incorrect because the variation in sheet thickness as received from the mill caused considerable variation in the position of the top edge of cut.

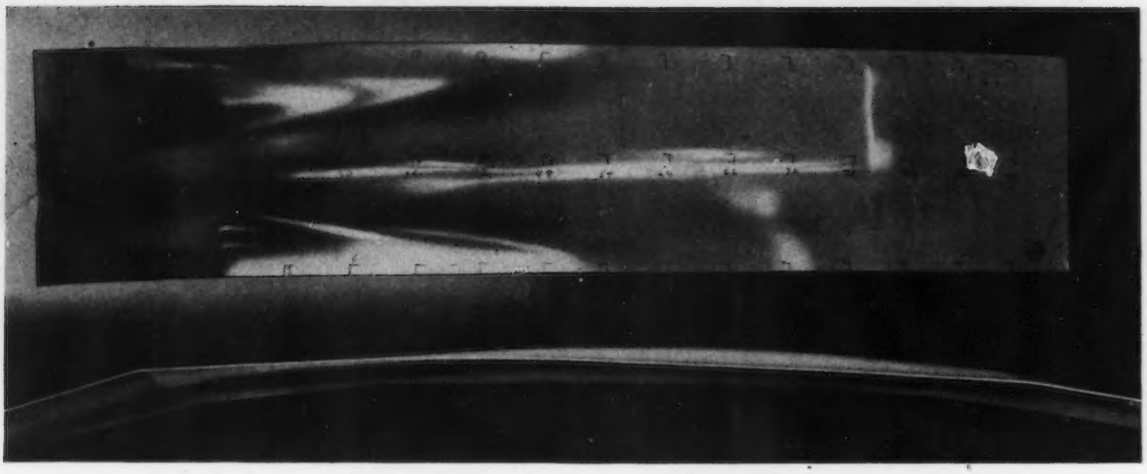

FIG. 5—Tapered sheets can be stretch formed to contour, but stretch forming has a tendency to cause the thinner sections to neck down and fracture. This shows a compound curve formed by stretching over a die for an engine cowl.

fasteners. Islands or reinforcements around access holes or other highly stressed areas are homogeneous with the tapered sheet, eliminating doublers and fasteners. Often the thickness of the tapered sheet is less than combined thickness of a skin and splice arrangement. Greater aerodynamic smoothness can be attained through elimination of joints between external skins. That airfoil skins can be tapered both chordwise and spanwise is important in swept-back wing aircraft.

Some disadvantages to taper milled parts are apparent. In machining clad aluminum alloy sheets, the pure aluminum protective coating is removed from one side, therefore requiring anodizing. In practice the selection of grip lengths of blind fasteners is complicated by the taper and must be carefully controlled by area. At present, material waste is high because of the method of cutting pieces from a 48 x 130 in. minimum sheet size.

Experience gained in recent months in producing tapered sheets has outlined the nature of improvements to be made to render the equipment more versatile and economical. Design studies and cost estimates made on variations of the hold-down method suggest that a separate hold-down plate for each part number is feasible. Since each plate can be made to the exact outline of the part, considerable savings in raw material can be effected by nesting more than one part in a single stock size sheet.

A special plate for a given part can have the proper taper milled into its surface. When loaded onto the machine no adjustment or leveling of the hold-down plate is necessary and only the depth of cut by the milling head need be set. The length of carriage travel under the milling head is sufficient to accommodate any length of sheet up to 20 ft and by this important structural gains through the elimination of splices and weight can be attained.

SAE Standards Published for H-Band Steels

THE use of hardenability characteristics as a basis for the specification of certain grades of alloy steels, instead of specification by chemical analysis, has been raised from a tentative to a full standard and specification status for the first time in the "1949 SAE Handbook."

As a result of the cooperative work by the Society of Automotive Engineers, Iron and Steel Technical Committee, Div. III, and the Technical Committee on Alloy Steel Bars of the American Iron & Steel Institute, hardenability bands have been devised that are considered satisfactory for use in describing certain characteristics of constructional alloy steels. These hardenability limits and their conditions of use are set forth as SAE Standards and Specifications, and were determined by the standard 1-in. end-quench hardenability tests.

There have been many improvements in the bands and some changes in shape resulting from experience gained the past four years. The minimum and maximum hardenability limits for each of the steels for which H bands have been established are shown as tabular values of Rockwell C hardness. These values are rounded off to the nearest full hardness value and are designed to be used for specification purposes.

Hardenability limits are shown for all alloy steels for which there has been sufficient hardenability data accumulated and only for those grades where the standard end-quench test can be used. As information is accumulated on other grades, the list will be supplemented. At present there are 76 grades listed in bar sizes from 1/16 in. to 1-in. diam in increments of 1/16 in., and from 1-in. to 2-in. diam in increments of ⅛ in. As a means of identifying steels specified to hardenability band limits, the suffix letter H has been added to the conventional SAE series number.

Influence of Lead on Behavior

THOSE engaged in the working of austenitic stainless steels, especially of such high-alloy types as 18-8 Mo, 25-20, etc., are aware of the difficulties encountered in rolling or forging them in ingot form. To obtain fairly good results in hot working, it is indispensable to maintain most carefully the analyses specified, the proper temperature and time of heating to rolling or forging. However, even if greatest care is taken in these respects, failures may result, and formerly there were unaccountable changes between periods of good and poor workability which defied strenuous efforts to explore their true causes.

It was particularly the metallurgical aspect of production which received a most detailed study. Among other factors, the effect of impurities of the most varied kinds was studied; however, the results were entirely negative.

In connection with the use of certain emergency type alloys, during the last war, suspicion was leveled at lead, and some small-scale tests proved that the suspicion was well founded. With the aid of spectro-analytical studies, first at the Metallographic Institute at Stockholm, and then at Hagfors Steel Works, the presence of lead was discovered in the products. Such contents were, as a rule, only a few thousandths of one percent, but, as soon as a certain critical value, which differed with each steel, was exceeded, the effect became very pronounced.

As soon as the influence of lead had been revealed, strict remedial measures were taken at the steel plant. Old scrap of unknown composition was no longer used, the alloy metals were subjected to analysis and classified as

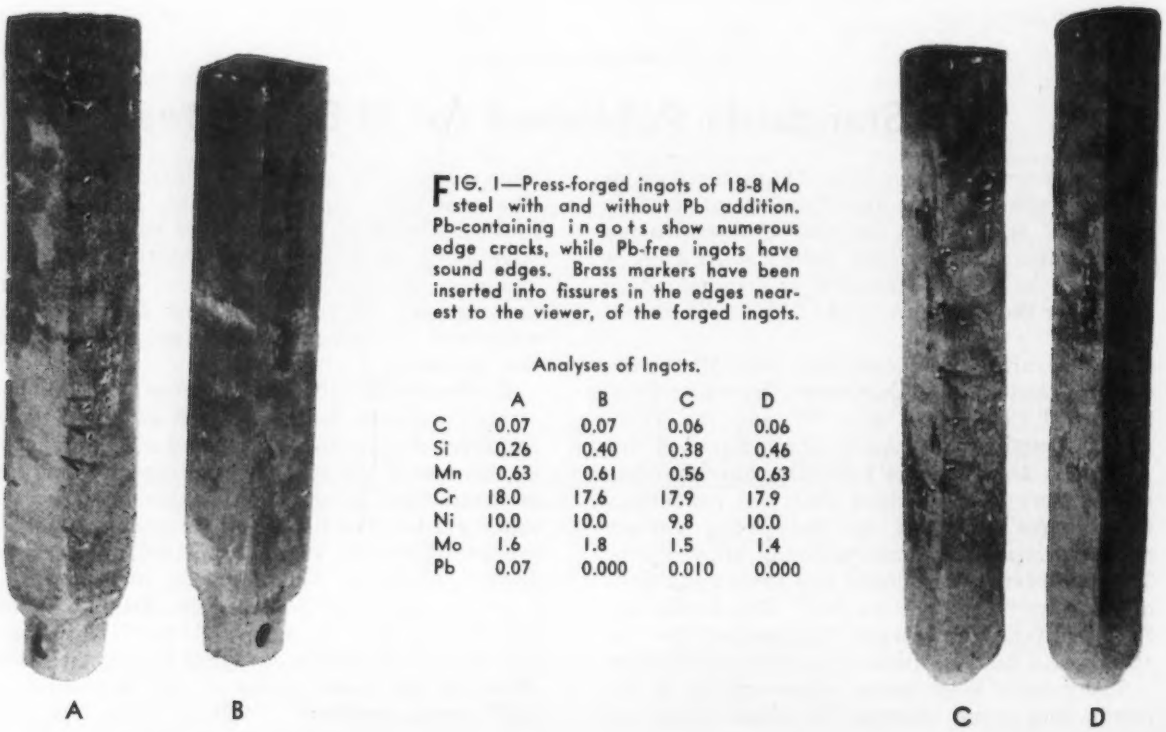

FIG. 1—Press-forged ingots of 18-8 Mo steel with and without Pb addition. Pb-containing ingots show numerous edge cracks, while Pb-free ingots have sound edges. Brass markers have been inserted into fissures in the edges nearest to the viewer, of the forged ingots.

Analyses of Ingots.

	A	B	C	D
C	0.07	0.07	0.06	0.06
Si	0.26	0.40	0.38	0.46
Mn	0.63	0.61	0.56	0.63
Cr	18.0	17.6	17.9	17.9
Ni	10.0	10.0	9.8	10.0
Mo	1.6	1.8	1.5	1.4
Pb	0.07	0.000	0.010	0.000

Of Stainless Steel

BY S. BERGH

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The presence of lead in excess of certain critical amounts in 18-8 and 25-20 stainless steel adversely affects hot working properties, as indicated by quantitative data presented by the author. A description of the application of microexamination and lead printing in the detection of lead inclusions along primary grain boundaries is also given.

either suitable or unsuitable, free cutting (lead-containing) steel scrap was segregated and held in readiness for special furnace campaigns, etc. The results obtained with these measures were highly favorable.

The study which threw light on the deleterious effect of lead upon the behavior of steel in rolling started with absolutely lead-free

This article is a translation from Jernkontorets Annaler, vol. 132, No. 6, 1948, by Henry Brutcher.

alloy metals and four heats of 18-8 Mo steel in a 55-lb high frequency furnace were made. Two of the heats were entirely free from lead, while the other two received additions of 0.07 pct and 0.01 pct Pb, respectively. The square-section ingots poured were then forged under identical conditions in a small hammer. The result is shown in fig. 1, and it can be seen that the small lead additions resulted in a considerable reduction in forgeability.

Fig. 2 indicates the manner in which the impaired hot workability manifested itself on frequent occasions at the rolling mill of Hagfors.

The inter-relation between rollability and lead content becomes quite clear from an inspection of table I which contains data on a number of different steel heats. It seems that the maximum permissible lead content, which constitutes the borderline between good and poor behavior in rolling is about 0.005 pct for 18-8 steel, straight as well as molybdenum-modified. For 25-20 steel, only a few analyses are available; however, they seem to point to a still lower critical lead content. If this critical value is exceeded, edge cracks develop on the ingots rolled and these cracks increase in number and depth, the higher the lead content.

It should be borne in mind that poor workability manifests itself above all in the ingot stage. If there is no objection to grinding off the cracked edges, then good rollability can be obtained in subsequent processing, especially if the particular steel does not have too high an alloy content. With more highly alloyed steels and especially with pure nickel and related alloys, the effect of lead persists even during rolling to light sections, as is evidenced by fig. 3.

TABLE I

Composition and Behavior in Rolling of Various Austenitic Steels.

Steel	C	Si	Mn	Cr	Ni	Mo	Pb	Rollability
18—8	0.10	0.30	0.47	17.6	8.7	—	0.004	Good
	0.06	0.41	0.50	17.3	9.5	—	0.004	
	0.09	0.68	0.67	18.1	9.4	—	0.011	
	0.09	0.58	0.47	18.2	8.4	—	0.012	
	0.08	0.42	0.53	18.4	8.5	—	0.023	Poor
	0.11	0.40	0.40	17.9	8.9	—	0.044	
	0.08	0.27	0.50	17.8	8.4	—	0.065	
	0.07	0.40	0.47	18.0	8.4	—	0.10	
18—8—Mo	0.05	0.49	0.83	16.8	11.7	1.4	<0.004	
	0.05	0.47	0.71	17.9	9.7	1.4	<0.004	
	0.04	0.35	0.44	16.8	10.1	1.5	<0.004	
	0.04	0.79	0.89	17.2	11.3	1.4	<0.004	
	0.05	0.80	0.81	17.3	11.3	1.4	<0.004	
	0.10	0.68	0.66	18.4	9.8	1.4	<0.004	Good
	0.05	0.66	0.66	17.3	9.6	1.4	<0.004	
	0.06	0.67	0.98	17.4	11.3	1.4	0.005	
	0.05	0.80	0.91	17.4	11.1	1.5	0.005	
	0.05	0.46	0.89	17.2	10.9	1.3	0.005	
	0.05	0.71	0.97	17.4	11.4	1.3	0.005	
	0.07	0.55	0.66	18.2	9.8	1.3	0.007	
	0.06	0.55	0.77	16.8	11.2	1.3	0.008	
	0.08	0.34	0.79	18.2	9.8	1.7	0.011	
	0.05	0.59	1.06	17.5	11.3	1.4	0.012	Poor
	0.07	0.38	0.75	17.6	9.6	1.5	0.014	
	0.08	0.39	0.78	18.1	10.1	1.7	0.017	
	0.05	0.59	0.98	17.1	11.6	1.4	0.017	
	0.06	0.63	1.00	17.2	11.3	1.4	0.018	
25—20	0.04	1.74	0.20	22.8	20.1	—	0.000	Good
	0.07	1.64	1.04	23.3	21.6	—	<0.004	
	0.06	1.49	0.94	23.6	21.9	—	0.004	Poor
	0.05	1.43	1.00	24.4	21.6	—	0.007	

After the effect of lead contents had thus been established empirically, considerable effort was devoted to finding a theory able to clarify the mechanism involved in the development of the cracks. Microexamination suggested itself as the most obvious way, especially a study of the microstructure extending as far as the cracks, and their propagation. Various attempts were made in this direction and in all cases it was found that the cracks follow the boundaries of the so-called primary grain, in other words, those zones of the steel which are the last to solidify. In spite of considerable effort, however, it was impossible to detect any lead particles in the cracks or their extensions, or in the particular steel in general, in a study of the most commonly used steels having relatively low lead contents. Several experiments were carried out to ascertain whether or not lead occurs in steel in solid solution or as metallic particles.

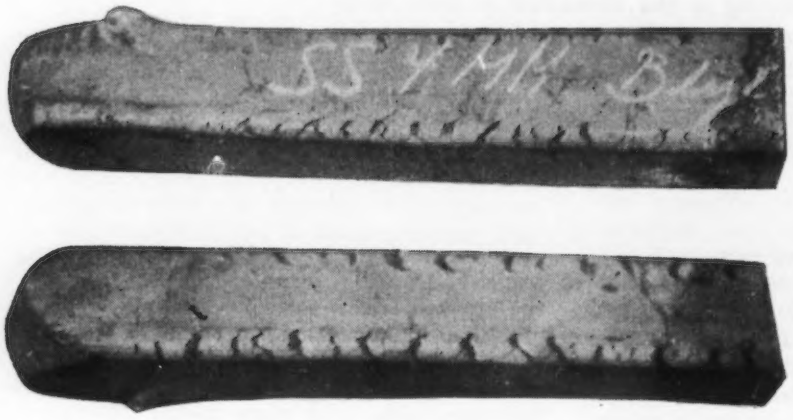

FIG. 2—Typical edge cracks as obtained in the rolling of Pb-containing materials. Composition: 0.04 C, 0.45 Si, 0.51 Mn, 18.3 Cr, 10.1 Ni, 1.6 Mo, about 0.015 Pb. Figure shows upper and lower side of 5-in. square, rolled directly from a 12-in. ingot. Ingot tends to split longitudinally.

There is reason to believe that lead is soluble in the liquid phase in a high alloy Cr-Ni steel inasmuch as its solubility in liquid chromium and nickel is considerable. The following experiment shows that this assumption is correct. To an experimental Cr-Ni steel melt, about 0.25 pct Pb was added a few minutes before tapping. The heat was caused to granulate in water in order to avoid a possible sedimentation during freezing. According to chemical analysis, the composition of the granules was as follows: 0.08 C, 0.40 Si, 0.15 Mn, 13.6 Cr, 25.3 Ni, and 0.24 Pb.

The granules were mounted in bakelite, ground and polished, etched for primary structure with Kalling's reagent[1], and etched for lead according to von Vegesack's method[2]. Fig. 4 shows that the lead particles follow the boundaries of the primary grain; from this, the conclusion can be drawn that the lead had been in solution in the molten steel.

In order to determine the solubility of lead in the solid phases of steel, the so-called lead printing process by Wragge[3] was used. The principle of this method is as follows: A foil, for example, gelatinized paper, or cellophane strip, impregnated with NaOH solution is pressed against a filed surface of the particular steel. Metallic lead particles are acted upon by the solution, and at the points in question the foil contains lead ions, which upon subsequent treatment of the foil in Na_2S solution form dark PbS.

Wragge's method responds to extremely small particles of metallic lead, as well as to larger ones. On the other hand, the method should not respond to lead which is present in the steel in solid solution form; this is in agreement with several known cases of a similar nature. Thus, for instance, metallic copper readily dissolves in nitric acid; on the other hand, small amounts of a few tenths of one percent of copper in an 18-8 steel, where copper is in solid solution, remain unaffected by nitric acid. This may be accounted for, probably, by the assumption that the passive film can cover, and thus protect, the copper atoms arranged in the steel lattice at uniform intervals. The same must hold good for lead in solid solution.

Antimony is a metal which, according to literature data[4], is able to take up at least a few tenths of one percent of lead in solid solution. The author proved by experiment that antimony alloyed with 10 pct or 1 pct Pb, respectively, gave intensely colored lead prints whereas antimony containing only 0.1 pct Pb, when tested by the same method, did not produce any darkening.

Thus, it was established that lead printing lends itself to determining the limit of solubility of lead in solid steel, and a series of lead prints were made of 18-8 steel containing successively lower amounts of lead. It was found that lead could be distinctly detected in steel containing as little as 0.01 pct Pb; in other words, a lead content little higher than the empirically established limit for the effect of lead upon the grain boundary cohesion. It is hardly to be expected that with a method as rough as lead printing, exact determinations of still lower contents can be made. Very thin lead films in the grain boundaries are probably protected from attack by NaOH by the surrounding steel.

The investigations described in this article

A

B

FIG. 3 — Rolling of strip of pure nickel containing (A) 0.002 Pb, (B) 0.010 Pb and (C) 0.05 Pb.

C

have revealed that in austenitic Cr-Ni steel containing lead in amounts of the order of 0.01 pct and probably lower, metallic lead occurs along the primary grain boundaries. It has not been possible to determine this lead by micrographic analysis, perhaps because the lead particles are extremely small or because they are dislodged during the preparation of the metallographic specimen. It must be assumed that lead present in this form is bound to weaken the cohesion of the steel at the primary-grain boundaries, and the fact that at rolling temperatures, lead occurs in the liquid form may be thought to render its effect still more harmful.

In view of the high mechanical stresses which are created at the ingot surface during rolling or forging of austenitic steel, which is hard at the temperatures in question, this is bound to result in the development of cracks, such as are found in commercial rolling and forging operations. Steel which is less hard in the heated condition, for instance, 18 pct Cr steel or 25 pct Cr steel, is not appreciably affected in its hot workability by small contents of lead.

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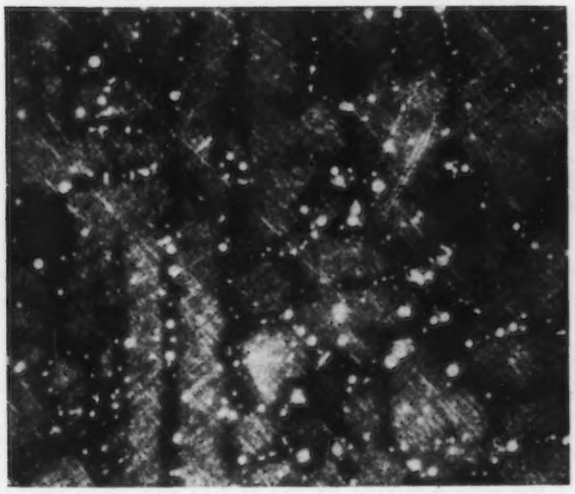
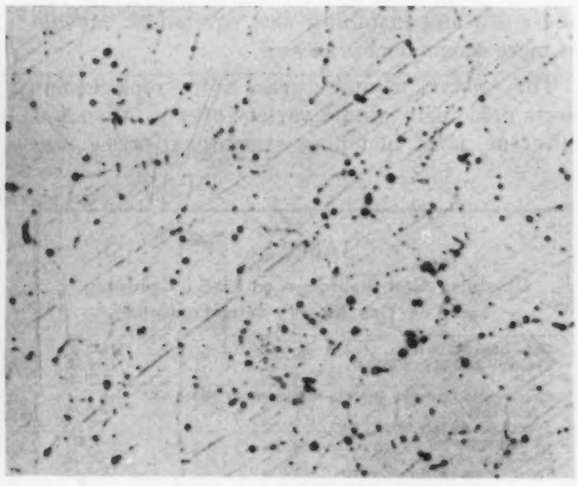
[2] A. von Vegesack, "Method of Etching for Identification of Lead in Microstructure of Lead-Alloyed Free-Cutting Steel," Jernkontorets Annaler, vol. 126, 1942, p. 559.
[3] W. B. Wragge, "Lead Printing Ferrous and Nonferrous Metals," Metallurgia, May 1945.
[4] M. Hansen, "The Constitution of Binary Alloys," (Book, in German), Berlin, 1936.



A



B

FIG. 4—Specimen surface has been purposely polished very lightly (grinding grooves have remained behind). Because of the omission of a fine polish, the lead particles have been but slightly attacked or dislodged, resp., by Kalling's etchant; (A) is dark field illumination, (B) light field. 300X.

Case

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TYPICAL parts heat treated in the Dow hardening furnace. Some 500 to 1200 lb of these parts can be processed per furnace load.

WITH industry once again entering a competitive market, manufacturers are searching for methods of reducing manufacturing costs, and thus, an installation which has trimmed more than 68 pct from heat treating costs is of timely interest. One large manufacturer of motor vehicles has effected these savings after analyzing heat treating procedures and costs and installing new equipment capable of more economical processes.

This plant manufactures auto replacement parts principally, and a variety of more than 150 different parts including stampings, screw machine parts, forgings, etc., are involved. This, and the fact that any single part produced in quantity one day might not be manufactured again for several weeks or months, places a demand for versatility on the equipment, which was not met by conventional, high-production gas atmosphere furnaces.

In view of the large variety of sizes and shapes of the parts and the fluctuations in production quantities expected in a service parts plant, consideration of equipment for this work was restricted to batch-type furnaces. Further qualifications placed upon the equipment were its ability to meet high quality standards and the adaptability to a material handling scheme that would reduce manual handling of parts to a minimum. Versatility in producing various types of heat treatments was also of prime importance, since it was reasoned that other equipment could then be shut down during slow periods, or its overflow absorbed during rush periods, if multiple purpose equipment could be obtained.

A portion of the original equipment in the heat treating department consisted of eight cyanide pots 17x26x13 in. Records accumulated over a period of one month indicated that 216,217 lb of stock were processed in these cyanide pots at an average cost of $0.023 per lb of stock treated, as illustrated in table I. Of this quantity of work, 95,940 lb were treated to a

TABLE I

Operating Cost Breakdown on Liquid Cyaniding Based on One Month's Total Production

Gas—3,286,080 cu ft	$1632.52
Cyanide—8200 lb @ $0.013	1066.00
Labor	1567.68
Maintenance (includes cleaning vents and air ducts, roof repair, etc.)	405.09
Setup time (5 pct of direct labor)	78.30
Air for combustion	92.47
Ventilation water	22.78
Power for ventilation and water	104.03
Total Monthly Cost	$4968.87

Total work cyanided per month: 216,217 lb
95,940 lb — 0.010 to 0.020 in. case depth
Balance — 0.003 to 0.005 in. case depth
Average cost per pound = $0.023

Hardening Automobile Parts

Already applied to the case hardening of more than 150 different types of parts, including stampings, screw machine parts and forgings, the controlled atmosphere furnace described in this article has effected substantial savings in the production costs of automobile parts. Detailed operating data, based on the experiences of a large automobile manufacturer, are presented in this article concerning the processing of several typical parts. A description of the batch-type furnace is also included.

0.010 to 0.020 in. case depth and the balance to a 0.003 to 0.005 in. case depth. A total of five men per shift were required to operate this equipment plus eight box furnaces used for pack carburizing gears and shafts to case depths from 0.030 to 0.060 in. effective case.

A survey of the equipment available which might fulfill the qualifications indicated above, resulted in the purchase of a Dow Model B controlled atmosphere furnace. Fig. 1 is a cross-sectional view of the furnace, illustrating its design features.

A screw drive mechanism provides means for introducing the charge into the furnace chamber, where it is held for the desired time and at the desired temperature. The high volume circulating fan, mounted directly below the charge, draws the atmosphere down through the load, passing

TABLE II

Case Depths Produced by Gas Cyaniding Bulk-Loaded Parts.

Time at Heat, Min	POSITION NUMBER									
	1	2	3	4	5	6	7	8	9	10
5	0.002	0.0015	0.0015	0.0015	0.002	0.0025	0.002	0.0025	0.0015	0.0025
10	0.0025	0.002	0.0025	0.0025	0.003	0.0025	0.0025	0.0025	0.0025	0.0035
18	0.003	0.003	0.002 0.003	0.003	0.003 0.0025	0.003	0.003	0.003	0.003	0.003
18	0.0025 0.003	0.0025	0.0025	0.0025	0.003 0.0025	0.0025	0.003	0.003	0.003	0.0025
18	0 0035	0.0035	0.0035	0.0035	0.004	0.0035	0.004	0.004	0.004	0.0035

Location of Samples

1—Right front box—top front of load
2—Left front box—top front of load
3—Left front box—center of load
4—Right front box—center of load
5—Right rear box—center of load
6—Left rear box—top rear of load
7—Left rear box—center of load
8—Left rear box—right front corner at bottom of load
9—Right rear box—left front corner at bottom of load
10—Right rear box—top rear of load

TABLE III

Comparison of Operation Costs as Performed by Liquid Cyaniding and Gas Cyaniding.

PART	Labor Cost per Piece, $		Savings per Piece, $	Savings, Pct	Case Depth, In.	Total Furnace Time, Min	Lb. per Load
	Liquid Cyaniding	Gas Cyaniding					
Clutch Release Fork Assembly	0.012	0.0038	0.0082	68	0.010-0.020	125	660
Accelerator Shaft Bracket	0.0054	0.0005	0.0049	90	File Hard	50	556
Steering Gear Column Jacket Selector Lever	0.0049	0.0017	0.0032	65	0.010-0.012	125	764
Accelerator Shaft Bracket	0.0054	0.0014	0.004	74	File Hard	45	460

it up through the "heat capacitor" and around the radiant tubes, then back down through the load. The directed path of circulation of the atmosphere in large volume not only accomplishes rapid and uniform heating of densely loaded parts, but also results in the production of uniform depths of case on these parts.

The screw drive then ejects the charge into the controlled atmosphere vestibule onto the inner elevator, which lowers it into the quenching medium. A propeller, mounted at the bottom of the quench tank, circulates the quenching oil down through the load, also in a directed path, in a manner similar to that of the circulating gases. An effective and uniform quenching of all parts with minimum distortion is accomplished by this quenching system.

After approximately 1½ min in the quench, the elevator is raised and the charge manually transferred on gravity rolls from the inner elevator to the outer elevator, where it is deposited on a cross gravity roll conveyer extending across the front of the furnace. From this point the stock containers can be rolled to an unloading station and refilled for a subsequent charge.

Since quenching is accomplished from a controlled atmosphere vestibule, the work produced is free of scale and decarburization. An innovation in gas generator design exists in the incorporation of the conventional catalytic generator within the radiant tubes. This produces a carrier gas neutral to a medium carbon steel, and thus excludes the need for the more common separate generator. This feature permits the

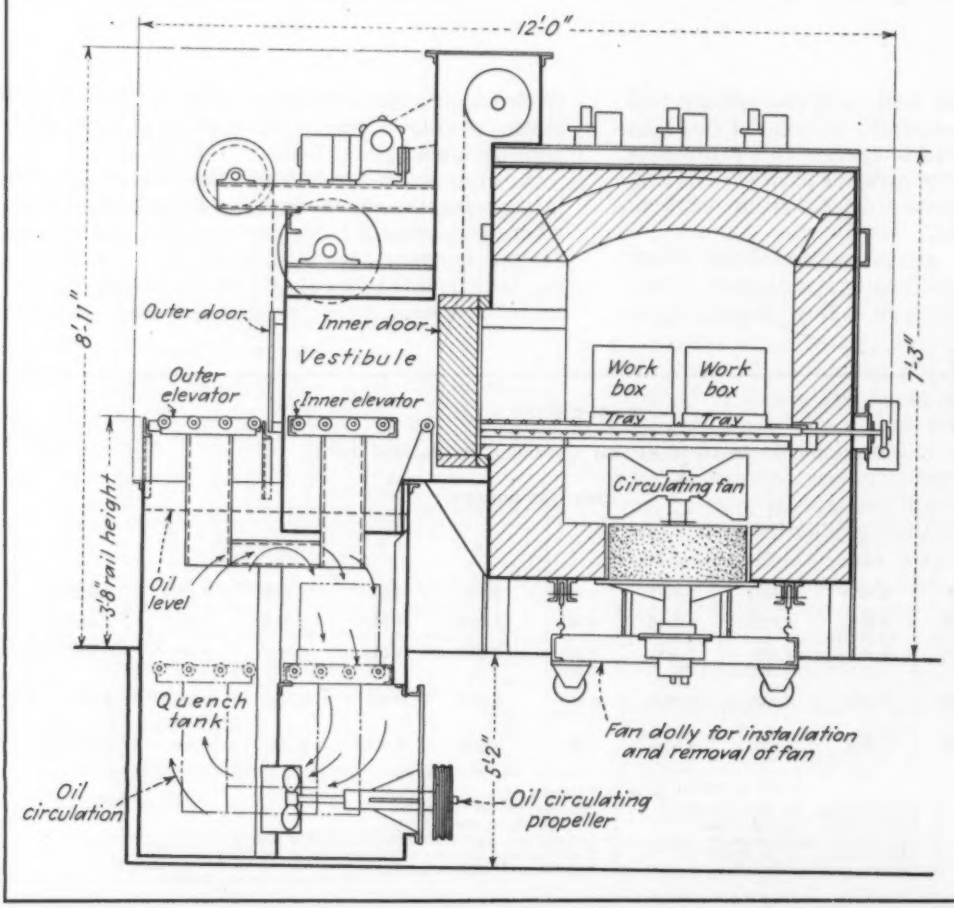


FIG. 1 — Cross-sectional view of the Dow model B controlled atmosphere furnace.

FIG. 2—Dow battery installation, including four hardening furnaces, a draw furnace and a washing machine, connected by gravity roll conveyer, in large automotive plant. Individual quenching tanks in foreground.

use of the furnace for clean hardening medium carbon steels in addition to gas cyaniding and gas carburizing.

Production operation of the furnace soon revealed that the quality and economic considerations were more than adequately attained. Quality standards were met by the production of uniform case depths on light case, bulk-loaded parts as illustrated in table II; cost reductions were made possible by savings effected in direct labor, illustrated by figures derived by the time study department (see table III); the versatility of the unit was proven by its ability to process a wide variety of parts and heat treatments.

On the basis of the advantages demonstrated by this initial installation, three additional similar furnaces, a Dow Model C wash machine and a Dow Model D tempering furnace were installed. The latter two units are designed as companion units for the Dow Model B furnace for washing and tempering the work without transferring from the work containers.

The initial installation was relocated in line with the three later installations, so that the six units, comprised of four atmosphere furnaces, the wash machine, and the tempering furnace form a single battery connected by a gravity roll conveyer, as illustrated in fig. 2.

The gravity roll conveyer provides easy means for transporting the loaded work containers from

TABLE IV

Operating Costs for Gas Cyaniding Clutch Release Forks to a Case Depth of 0.010 to 0.015 in., Parts to be File Hard.

	Minutes per load
Heating time	45
Holding time	65
Loading and unloading time	15
Total	125

$$\text{Capacity} = \frac{\text{Net load—660 lb}}{125\ \text{min}} = \frac{660\ \text{lb} \times 60\ \text{min/hr}}{125\ \text{min}} = 315\ \text{lb/hr}$$

OPERATING COST:	
Natural gas for heating: (0.74 hr x 1000 cu ft per hr) + (1.4 hr x 150 cu ft per hr) x $0.64/1000 cu ft	$0.592
Propane for atmosphere: 2.1 hr x 1.1 gal/hr x $0.105/gal	0.243
Ammonia for atmosphere: 2.1 hr x 30 cu ft per hr x $0.0075/cu ft	0.473
Power: 2.1 hr x 4 kw/hr x $0.012/kw	0.101
Allowance for maintenance: 2.1 hr x $0.75/hr	1.575
Labor: (½ the time of one man) 2.1 hr x $1.55/hr / 2	1.628
Total cost per load	$4.612

$$\text{Cost per Pound} = \frac{\$4.612}{660\ \text{lb}} = \$0.007$$

TABLE V

Cost Data for Gas Cyaniding Accelerator Brackets to a Case Depth of 0.003 to 0.005 in., Parts to be File Hard.

	Minutes per load
Heating time	25
Holding time	5
Loading and unloading furnace	15
Total	45

$$\text{Capacity} = \frac{\text{Net load—460 lb}}{45\ \text{min}} = \frac{460\ \text{lb} \times 60\ \text{min/hr}}{45\ \text{min}} = 612\ \text{lb/hr}$$

OPERATING COST:	Cost per load
Natural gas for heating: (0.42 hr x 1000 cu ft per hr) + (0.33 hr x 150 cu ft per hr) x $0.64/1000 cu ft	$0.300
Propane for atmosphere: 0.75 hr x 1.1 gal/hr x $0.105/gal	0.087
Ammonia for atmosphere: 0.75 hr x 30 cu ft per hr x $0.0075/cu ft	0.169
Power: 0.75 hr x 4 kw/hr x $0.012/kw	0.036
Allowance for maintenance: 0.75 hr x $0.75/hr	0.562
Labor: (½ the time of one man) 0.75 hr x $1.55/hr / 2	0.580
Total cost per load	1.734

$$\text{Cost per Pound} = \frac{\$1.734}{460\ \text{lb}} = \$0.0038$$

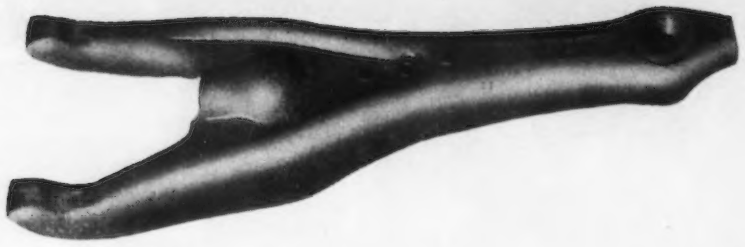


FIG. 3—Closeup of clutch release fork. Detailed operations cost shown in table IV.

a loading area located at either the right or the left of the battery, to a storage station next to each furnace. The storage station consists of a double tract of gravity rolls mounted on casters, which permit its forward and backward movement. Thus either the front or back section of the storage station may be moved in line with the gravity roll conveyer, permitting finished work to bypass green stock on the conveyers. In this way, the same conveyer permits transporting finished work from any furnace through the wash machine, into the tempering furnace if desired and thence to the unloading area. A new furnace load stands ready to charge each furnace as soon as its cycle is completed.

It had been planned that this battery would absorb the production of the previous eight cyanide pots and six of eight box furnaces. An expanding production schedule introduced additional screw machine parts, however, requiring cyanide hardening and clean hardening of parts not formerly produced by this plant. This additional work was given preference in the new furnaces over the deeper case-carburized parts, and these units now absorb only a portion of the deep case work.

Savings from Rerouting Work

Simultaneously, a review of the specifications for the various parts resulted in the standardization of case depth specifications on some parts and the substitution on other parts of a carbonitrided case of 0.025 to 0.030 in. for the previous carburized case of 0.040 to 0.050 in. This permitted rerouting some of the previously pack carburized work into other continuous equipment running the required cycle, and in turn routing the carbonitrided work into the Dow furnaces. The savings resulting from reduced furnace time through these changes are obvious.

Because all of the work currently processed is not identical to that produced by the previous equipment in respect to either type of heat treatment or quantity, a true before and after picture cannot be given on the basis of overall production for any given period.

It is felt by this plant, however, that more than the equivalent production of the eight cyanide pots and the six box furnaces has been absorbed by the Dow furnaces. It is of interest that this production, including washing and tempering, when required, is now handled by two men instead of the previous five, who had operated neither a wash machine nor a tempering furnace.

Cost Data on Cyaniding

Since the new furnaces have significantly exceeded their rated capacity of 600 to 700 lb per hr on light case work (0.003 to 0.005 in.), labor savings may be illustrated in still another manner. The four furnaces (total minimum capacity of 2400 lb per hr on such work) and the wash machine and tempering furnace, are now operated by two men. Previously the same number of men processed less than 500 lb per hr of this work.

Typical net operating costs of gas cyaniding in the Dow Furnace may be illustrated as follows:

Labor rate	$1.55 per hr
Natural gas rate	0.064 per therm
Propane rate	0.105 per gal
Ammonia rate	0.0075 per cu ft
Power rate	0.012 per kw-hr
Allowance for maintenance	0.75 per hr

Actual cost data relating to gas cyaniding of auto replacement parts to a case depth of 0.010 to 0.015 in. and 0.003 to 0.005 in. are given in tables IV and V, respectively.

In addition to the economic advantages, the replacement of liquid cyaniding with gas cyaniding eliminated many nuisance maintenance problems such as cleaning and painting ventilation systems, roofs, skylights, etc. Distortion was reduced considerably on many parts when oil quenching became possible, instead of water quenching, following the gas cyaniding operation. With the elimination of the hazards and unpleasant working conditions that accompany liquid heat treating, better labor relations were also encouraged.

Treatment of Plating Mill Wastes

BY M. U. PRIESTER
Assistant Director, Consulting Div.,
W. H. & L. D. Betz,
Philadelphia

WITH the present trend of industry to install plants in lesser congested areas, the Penn Division of the Milford Rivet and Machine Co. constructed a new mill in Hatboro, Pennsylvania. This particular area is rather critical from the industrial waste standpoint, due to the fact that it is on the watershed of a clean stream that is used for one source of a large public water supply. It was therefore imperative that due consideration be given to the treatment of the liquid industrial wastes resulting from their operation.

The wastes from this mill consist of rinses from cyanide baths, copper, aluminum and nickel plating and highly alkaline solutions containing substantial amounts of suspended solids, oils and greases. For treatment purposes, the wastes were generally segregated into two groups; (1) plating and cyanide-bearing rinse wastes, and (2) the wastes from tumbling barrels, cleaning and degreasing operations. Due to the location, the plant was designed and installed for complete treatment. The treated effluent is prepared for discharge to either sanitary sewers with discharge to a local sewage treatment plant or to a storm drain, which is alternately an open stream through private property and an underground conduit, ultimately discharging into a larger stream flowing through an estate area.

Since the daily flow is relatively low and the human element of operation is present, permission was granted the company to discharge the completely treated wastes to the sanitary sewerage system.

The treatment plant was designed and installed on the basis of the accompanying flow diagram, fig. 1. Wastes from cleaning, degreasing and tumbling barrels flow by gravity to one of two tanks, where sulfuric acid is added for oil cracking. Air diffuser tubes in the bottom of these tanks assist in further oil separation. The oil is skimmed periodically and flows to an oil

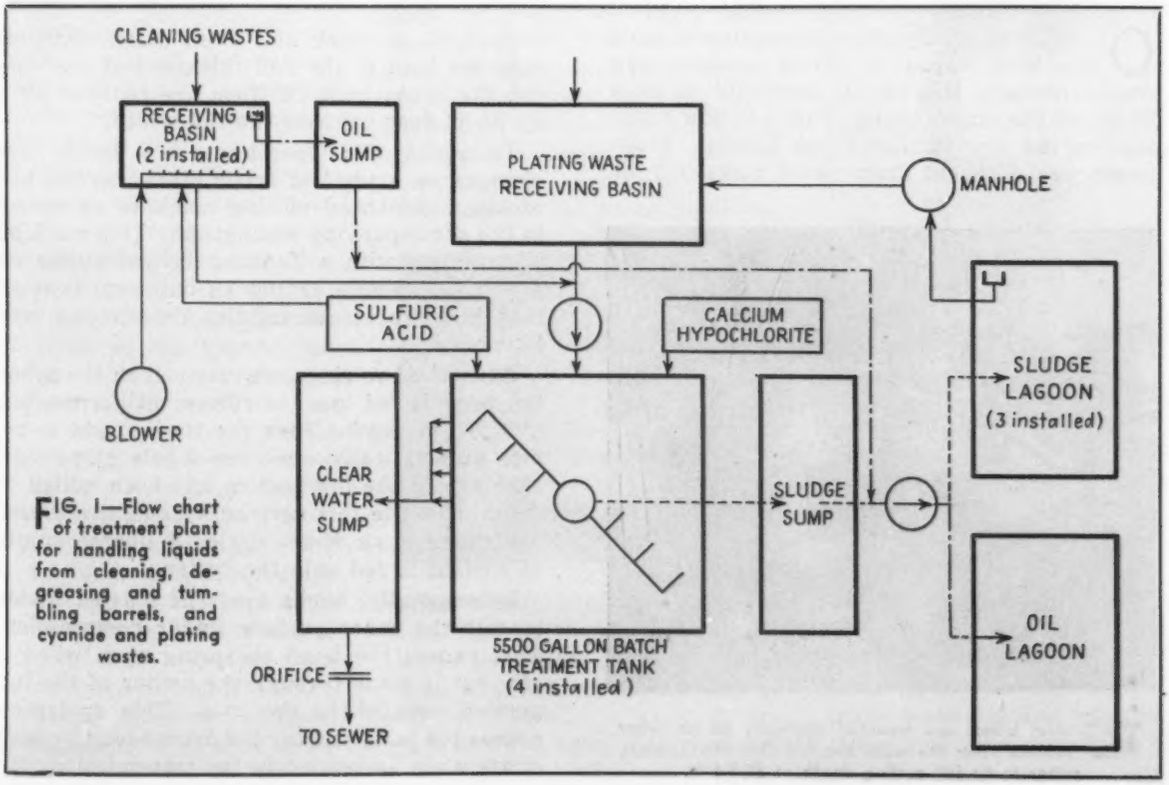


FIG. 1—Flow chart of treatment plant for handling liquids from cleaning, degreasing and tumbling barrels, and cyanide and plating wastes.

sump, from which it is pumped to an oil lagoon. Following the skimming operation, the remaining waste is pumped to one of the batch type chemical treatment tanks for blending with the other wastes for final treatment.

The cyanide and plating wastes flow to a receiving well from which they are pumped to one of four 5500-gal batch treatment tanks. Each of these tanks is equipped with slow paddle agitators and sludge scraper blades. In addition, each tank is equipped with a bottom sludge draw-off valve and multiple side draw down valves for clear liquid.

The mixed wastes analyze approximately as shown in table I. Calcium hypochlorite is added on the basis of cyanide content and other chlorine-consuming constituents, in order to obtain a stable chlorine residual of approximately 15 ppm. Following at least 15 min agitation and contact, sulfuric acid is added to the batch to effect coagulation. The pH is reduced to the optimum value for clarification. Following a thorough mix, the treated batch is allowed to settle 8 to 16 hr. Occasionally, difficulty is experienced in obtaining complete clarification and at such times small amounts of ferric sulfate are added to produce the required results. Each batch tank has a capacity approximating the volume of one day's wastes.

Following suitable settling time, the clear liquid is discharged to a final settling tank from which it flows by gravity through a calibrated orifice over a period of 24 hr to the sanitary sewers.

TABLE I
Analysis of Mixed Wastes.

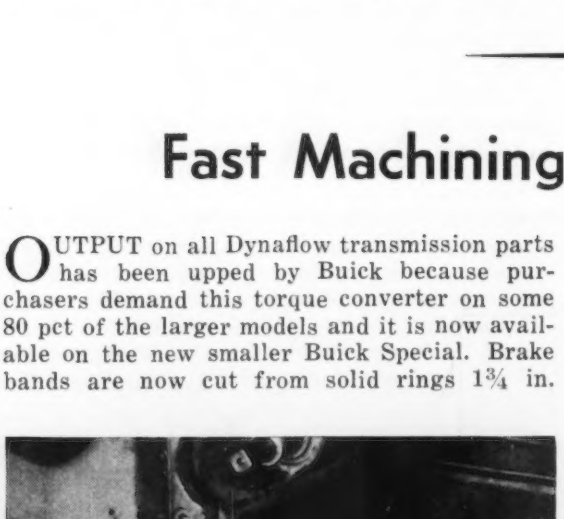
	Raw Mixed Wastes	Treated Wastes
Color, units	1000	20
pH Value	11.8	7.5
P Alkalinity as $CaCO_3$, ppm	5000	0
M Alkalinity as $CaCO_3$, ppm	6500	70
Suspended solids, ppm	300	5
Settleable solids, ml per l	30	1
Oil and grease, ppm	300	1.0
Cyanide as CN, ppm	85	0
Residual chlorine, ppm	....	5.0

Sludge resulting from the clarification process is discharged to the sludge sump and pumped to the receiving lagoon. Each lagoon is equipped with a decanting mechanism by means of which the supernatant liquid can be returned for retreatment with the mixed wastes.

The plant as installed is extremely simple and flexible, and is operated by a single operator for one 8-hr shift. Excellent results have been obtained and no difficulty has been experienced handling the treated wastes in the local sewage treatment plant. Complete records of operation are kept including tests of each batch discharged and copies of these are submitted to the local authorities.

Fast Machining of Brake Bands

OUTPUT on all Dynaflow transmission parts has been upped by Buick because purchasers demand this torque converter on some 80 pct of the larger models and it is now available on the new smaller Buick Special. Brake bands are now cut from solid rings 1¾ in. wide 9/16 in. thick and 7 in. diam. Integral lugs are held to the full thickness of the ring but the areas between them are reduced by a 29/64-in. deep cut over the full width.



TWO steel bands are mounted vertically on an arbor that rotates after the work has fed into the Tantung cutter to its full cutting depth of 29/64 in.

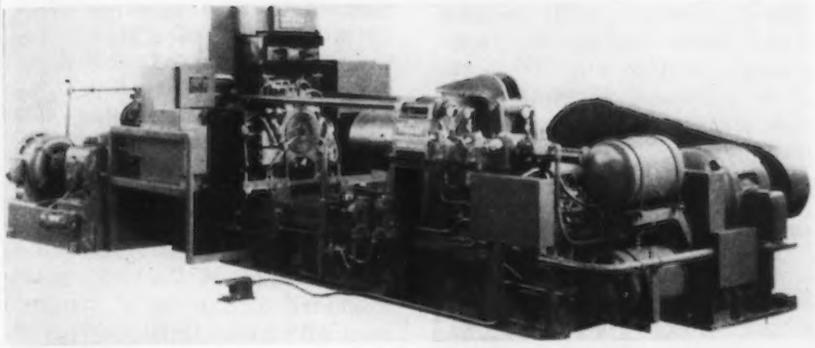
To speed this operation, two bands are clamped on a vertical arbor placed on the bed of the Sundstrand milling machine as shown in the accompanying photograph. This machine is equipped with a Tantung helical cutter on a vertical spindle having an outboard bearing that helps to insure rigidity despite the very heavy cut.

After the two rings are clamped on the arbor the work is fed into the cutter until it reaches a 29/64-in. depth. Then the work starts to rotate automatically until the whole circumference except the lug portion has been milled to depth. Despite this very heavy cut, two pieces are milled in an 80-sec. cycle. A liberal supply of coolant is fed onto the cutter.

Subsequently, bands are shot blasted inside to put the inner surface under compression. This causes the band to spring open when a saw cut is made through the center of the lug portion parallel to the axis. This springing causes the band to clear the drum around which it fits when assembled in the transmission.

New Production Ideas . . .

Forming machines, a metal-cutting band saw, a tool grinder, universal testing machines, diametral pitch gages, hardening equipment, and a dip tank are new and improved equipment described this week, together with milling machine attachments, a rotary die head, single point boring tools, weld nuts, scarfing torches, silver plating powder, and heat sensitive paint.

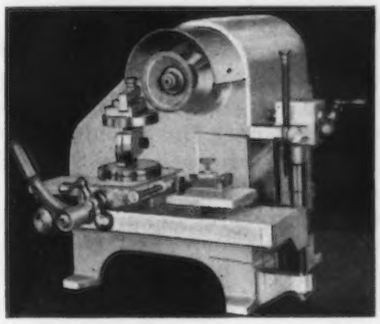


Forming Machine

TEN seconds are required to close completely the end of a -in. diam tube with ¼-in. wall nickness when using the new Westin Process forming machine. Once the machine has been initiated by a pushbutton at the operating station, the forming cycle is fully automatic. For short runs of special work, manual operation is provided, controlled by a selector switch, with separate push buttons for control of the clutch, chuck, and current initiation. Traverse speeds are infinitely variable from 0 to 100 rpm, and the eight step spindle speed ranges from 40 to 150 rpm. The three segment die and three transformers permit equal loading of each phase of the conventional three phase system. Accurate control of forming temperatures provides even heating which prevents work hardening or formation of strain flaws. Scale-free, smooth surfaces are produced. There is no porosity, no twisting of the tubing during forming, and the metallic structure of the work is kept within controlled limits. The machines accommodate work ranging from ¾ to 4 in., 4 to 8 in. and 8 to 16 in. diam. Brass, aluminum, copper, carbon steels and most alloy steels including stainless can be worked by the Westin process. *Federal Machine & Welder Co. For more information, check No.* 1 *on the attached postcard.*

Tool Grinder

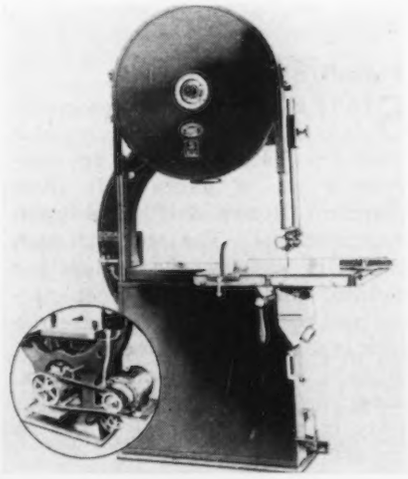
A TOOL grinder has been designed to grind automatic screw machine and turret lathe tools. Precision sharpness can be attained on all makes of chasers, circular form tools, dove-tail tools, block tools, tool bits and other cutting tools. Changes from one fixture to another, and from one setup to another can be accomplished



within 1 or 2 min, it is reported. Work holding fixtures hold each cutting tool in the same manner in which it is held in the diehead or tool holder while at work in the machine. The spindle is precision built and driven by a V belt from a ¼-hp motor. The grinder can be operated on any 110 v ac line. *Gopher Machine & Engineering Co. For more information, check No.* 2 *on the attached postcard.*

Metal-Cutting Band Saw

FOR cutting metals and alloys a high speed band saw with a heavy-duty four-speed transmission gives a choice of operating speeds from 150 to 1200 rpm. The wheels and motor are equipped with prelubricated and factory sealed bearings. New two-wheel equalized brakes stop the wheels smoothly in a few seconds when the brake



pedal is depressed, or automatically if a blade should break. *Moak Machine & Tool Co. For more information, check No.* 3 *on the attached postcard.*

Dip Tank

A NEW dip tank or melting pot known as Electrodip is thermostatically controlled and has been developed for dip coating parts, tools and dies with ethylcellulose and other removable plastic

coatings. As an oil bath it is used to transfer heat at accurately controlled temperature to irregular shaped containers. Any temperature set on the calibrated dial is said to be held to within 1°F.

Closed type heating elements of 1000 w and thermostat range of 60° to 250°F or 200° to 500°F are installed for either 115 or 230 v, as specified. Overall size is 12x12 x10 in. high. Thick walled aluminum casting dip compartment is tapered from 7x7 in. at top to 5x5 in. at bottom x 6 in. deep. Shipping weight is 37 lb. *H. McNaughton Co. For more information, check No.* 4 *on the attached postcard.*

Diametral Pitch Gages

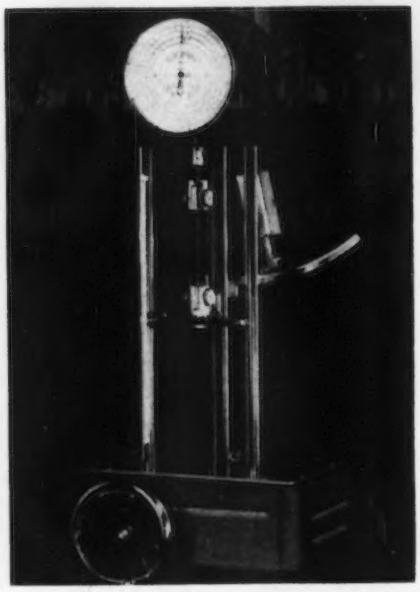
SIXTEEN separate gages covering 23 of the most popular sizes from 4 through 64 dp comprise a set of gages that show Standard Brown & Sharpe tooth measurements. The teeth in each gage are cut by the generating method, said to assure correct spacing and tooth form. Teeth are the rack type similar to those produced in hobs by cutter manufacturers. *American Gear & Mfg. Co. For more information, check No.* 5 *on the attached postcard.*

Selective Speed Drives

A NEW multispeed gearshift drive is a self-contained unit combining an integrally mounted motor and a four-speed transmission. It is designed to individually motorize machine tools formerly driven from lineshaft. Features include a unit-cast gearbox, all helical heat treated gears cut from steel forgings, precision-type bearings, oil reservoir equipped with magnetic drain plug. Gearshift lever is conveniently located and full rated horsepower is delivered in every speed. These units are built with four speeds in ratings of 3 hp at 900 rpm to 10 hp at 1800 rpm, with eight speeds in ratings of 1½ hp at 1200/600 rpm to 5 hp at 1800/900 rpm, instantly reversible in all speeds by using a motor reversing control. *Lima Electric Motor Co. For more information, check No.* 6 *on the attached postcard.*

Testing Machine

A UNIVERSAL testing machine now available is announced as the first entirely hand operated physical tester available in a testing range of from 0 to 100 lb. It may be calibrated in tenths of a pound, ounces, or kilograms. Indicator remains at peak load after specimen breaks. Reset is manual.



The machine handles specimens in tensile, compression, transverse and shear. Standard model has daylight opening between the grips of 14¾ in. Extra tall models can be supplied to give openings of 24, 36 and 48 in. The machines are hand operated through worm and gear drive floated in ball bearings. Overall height is 40 in. from bottom of base to top of head and net weight is 85 lb. *W. C. Dillon & Co. For more information, check No.* 7 *on the attached postcard.*

Microscope Attachment

DESIGNED to provide rapid comparison studies under three types of illumination, a microscope attachment provides bright field, dark field, and polarized reflected illumination. Known as the Tri-vert Illuminator, it can be attached to the body tube of any standard non-objective microscope for the examination of opaque or semi-opaque specimens. The change-over from dark to bright field illumination is instantaneous and is controlled by a lever. A Polaroid polarizer and cap analyzer provide for polarized light examination. Vertical illumination is attained by a glass reflector plate. A quadruple revolving nosepiece accommodates four objectives of patented design. These are mounted in an illuminating cell of transparent plastic. *Bausch & Lomb Optical Co. For more information, check No.* 8 *on the attached postcard.*

Hardness Testing

STEEL ball penetrators designed for accurate hardness testing in all makes of Rockwell testing machines are made of hardened steel with a smooth finish. They are available in 1/16, ⅛, ¼, and ½ in. sizes and are used with Rockwell scales B, E, F, G, H, K, L, M, P, R, S, V, 15-T, 30-T, and 45-T. The 1/16-in. size is furnished as standard equipment with the Clark standard hardness tester. *Clark Instrument Co. For more information, check No.* 9 *on the attached postcard.*

Load Visualizer

FIVE instruments are combined in one in a new ac load visualizer. Besides serving as a standard 0-2.5-5-25-50-amp ammeter and a 0-150-300-600-v voltmeter, the device is recommended for use with a split-core or conventional instrument transformer to extend the range for determining watts, vars, volt-amperes, and power factor. Designated as the Type AF-2, the

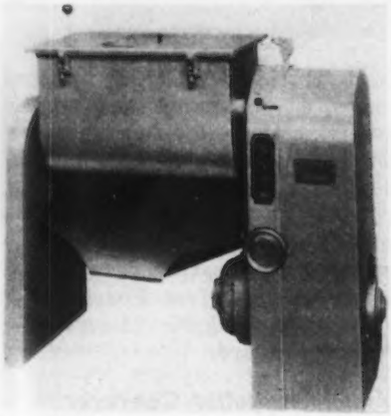
instrument can be applied in load surveys, induction motor tests, reactive power studies and power factor checks in power and lighting circuits. Accuracy of indication is said to have been determined to within 2 pct for volts and amps and within 5 pct for component amperes. *General Electric Co. For more information, check No.* 10 *on the attached postcard.*

Hardening Equipment

SELECTIVE hardening of cylindrical parts at feed rates to 6 ips is possible with a recently developed r-f hardening system. Operation can be made completely automatic when the cylindrical parts are of such design that they can be hopper-fed into an automatic loading device. This equipment consists of an automatic loading device, horizontal rotating scanner and industrial radio-frequency generator. It has been developed to harden a wide variety of cylindrical parts in any desired pattern. *Westinghouse Electric Corp. For more information, check No.* 11 *on the attached postcard.*

Mixers

THE new Series 21 mixers are available in 50, 100, 200 and 300-lb capacities. Improvements include dust-tight lids with rubber gaskets to prevent escape of dust; positive safety devices on the lid, with motor shutting off when lid is raised; variable speed control, with agitator speeds from 21 to 42 rpm; and all welded rigid construction. A completely enclosed drive protects working parts from dust and dirt.



An adjustable discharge chute can be tilted to any height and a simplified dumping mechanism has safety catch for locking the mixer in position. Another feature is pushbutton stop-and-start control, with jog button for jogging agitator around when dumping. *F. J. Stokes Co. For more information, check No.* 12 *on the attached postcard.*

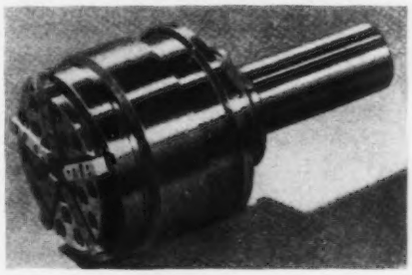
Milling Machine Attachments

A NEW line of attachments for bench milling machines includes vertical mill and slotting attachments and a rotary table. The vertical mill attachment is driven from the bench mill spindle, allowing use of the automatic feeds of the machine. It can be set at angles and pulled out past the travel of the table for large overhanding work. The unit is machined to slip over a 1½-in. overarm and adapted to other size overarms by bushings. The spindle takes end mills with

⅜- to 1½-in. straight shank, up to ½-in. diam cutter. A variety of work such as punches, punch holders, die shoes, clutches, molds and sprockets can be produced after installation. The slotting attachment also requires no extra motor, can be set at angles or pulled out past the travel of the table. Stroke is adjustable from 0 to 2 in. The holder takes tools having ½-in. shank. Dies, squared or splined holes, internal gears and other shapes can be produced with this slotter. The rotary table is proportioned for bench mill or shaper, measures 6 in. in diam, and is graduated in degrees. It locks from the bottom, assuring against tilting. All castings are iron. Worm is hardened and ground, with 40:1 ratio. Three 3-in. index plates and hand wheel are furnished. *Marvin Machine Products, Inc. For more information, check No.* 13 *on the attached postcard.*

Rotary Die Head

THE five chaser feature of Style KDS rotary die head is said to make possible improved threading



of square, flat and irregularly shaped stock, through the intermittent cutting action of the uneven number of chasers. This feature is also said to eliminate difficulties with parts such as square door knob spindles, parts having keyways, flat stock or similar threading jobs in which the cut is necessarily interrupted. Design features include positive tripping and resetting by means of a fork operating on the die head trip flange. Segmental front plates are removable and in case of wear may be restored to original accuracy by truing up on a surface grinder. *Geometric Tool Co. For more information, check No.* 14 *on the attached postcard.*

Machining Grooves

TOOLS for machining grooves to the dimensions recently approved by the Multiple V Belt Drive & Mechanical Power Transmission Assn. are supplied in two types. One has a brazed-on Kennametal blank and the other has the blank mechanically held by means of a socket head cap screw. These pulley grooving tools are cataloged in styles suitable for cutting grooves for V belts A through E. Grade K6 tips are recommended for the usual cast iron pulleys. *Kennametal Inc. For more information, check No.* 15 *on the attached postcard.*

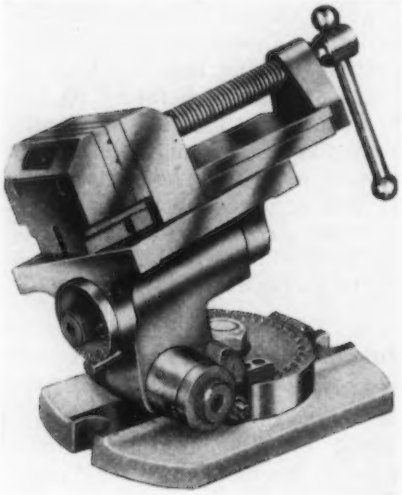
Deep Hole Boring

TO make it easier to bore deep holes with precision, a new line of single point boring tools of

solid tungsten carbide has been designed. Great rigidity and features including helical and spiral relief and constant clearance are claimed for these tools. They are made in two sections. The heads are carbide having high wear-resisting quality, while the shanks are a tough grade of carbide said to have maximum strength. The heads are designed to take fine cuts without glazing and to produce fine finishes with close tolerances. Ten sizes comprise the line with shank diameters running from 3/32 to ½ in.; overall lengths from 3 to 7¼ in.; max boring diameters from 0.115 to 0.600 in. *Bokum Tool Co. For more information, check No.* 16 *on the attached postcard.*

Angle Precision Vise

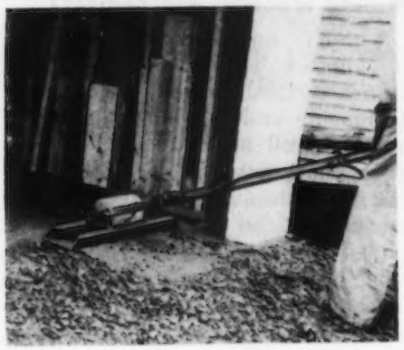
AN all-angle precision vise has a 90° cradle range, 45° each side of horizontal. Sizes are available with 3½- and 4½-in. jaws. The base swivels 180°, vertical set-



ting to 90°. With universal attachments for the vise a jig or fixture is easily made for production work in drilling, counterboring, tapping and reaming operations. Another feature is a screw for fine angle setting. *Matco Tool Co. For more information, check No.* 17 *on the attached postcard.*

Concrete Finishing

FOR semi-finishing concrete and mastic floors, sidewalks and streets, a new vibrating concrete float is available in two sizes. The units are said to be advantageous in floating extra low moisture content concrete and to speed up the process about five times over hand floating. Units are made up of a small 15-lb pulsating electro magnet vibrator mounted on a 24-30-in. wide steel float, a three-section, 7½-ft long tubular handle adjust-



able up or down for operators of various heights, and a 35-ft three-conductor grounded cable. Intensity of the vibration at the float can be varied by means of a dial switch in the controller furnished with the unit permitting the operator to handle concrete of different degrees of moisture. *Syntron Co. For more information, check No.* 18 *on the attached postcard.*

Silver Plating Powder

SILVER plating of high amperage electrical connections on the job by a new method has been announced. The product is said to be especially desirable for improving continuity of electrical service

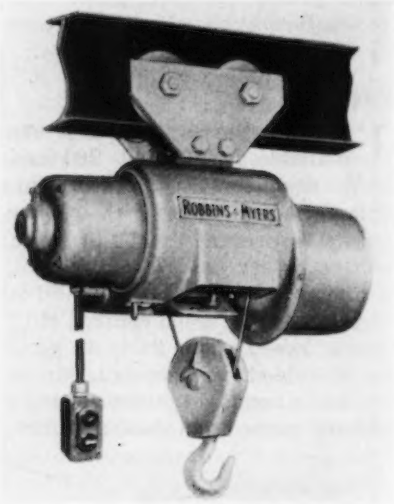
and reducing maintenance time. Known as Cool-Amp, this silver plating powder is claimed to prevent series of losses too small to create noticeable heat. It is described as depositing a coat of silver that will not peel off and to give a cool maximum conductivity for copper, brass or bronze contacts. *Cool-Amp Co. For more information, check No.* 19 *on the attached postcard.*

Hard Facing Electrodes

FOR extreme abrasion and mild impact conditions, such as encountered in construction and mining industries, a newly introduced hard facing rod is said to be easy to apply on carbon and manganese steel parts. It is available in 14-in. lengths in diameters of ⅛, 3/16, and ¼ in. Rockwell C hardness of this rod is 61 to 65 as deposited. It is claimed not to anneal under heat. *Wall Colmonoy Corp. For more information, check No.* 20 *on the attached postcard.*

Utility Hoist

A LOWER priced utility hoist, known as the Type J Wire Rope Hoist, is offered for special lifting requirements or general handling operations. This type unit is suitable for stationary,

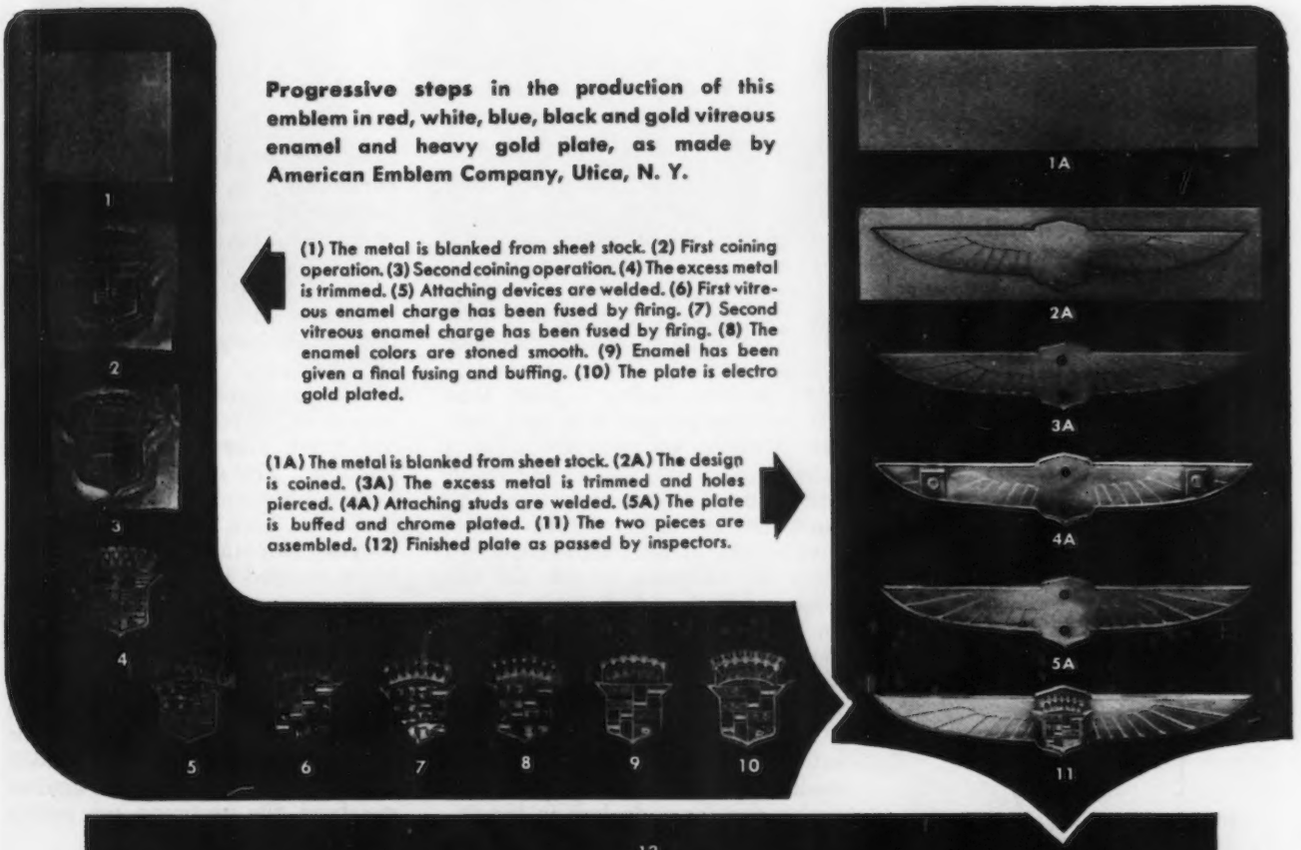


hook, or trolley mounting in small shops, on production floors and in receiving dock and loading areas. These units are available in ¼, ½ and 1-ton capacities with pendent rope or push button control. All models are equipped with totally-enclosed, ball bearing motors. *Robbins & Meyers, Inc. For more information, check No.* 21 *on the attached postcard.*

Aluminum Roller Conveyer

A ROLLER conveyer made entirely of high tensile aluminum with the exception of steel ball bearings, is offered in 1¾ in. diam, No. 15 gage, 7/16 in. hexagon

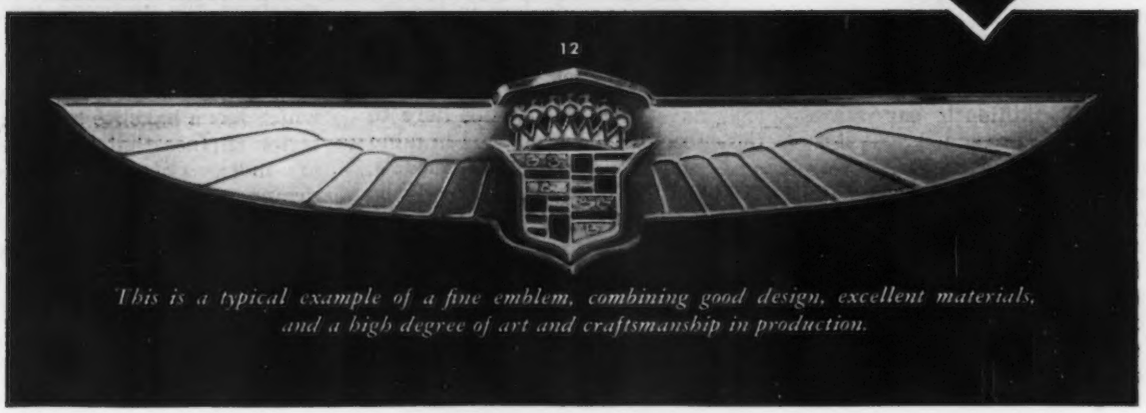
How the base metal protects the finish



Progressive steps in the production of this emblem in red, white, blue, black and gold vitreous enamel and heavy gold plate, as made by American Emblem Company, Utica, N. Y.

(1) The metal is blanked from sheet stock. (2) First coining operation. (3) Second coining operation. (4) The excess metal is trimmed. (5) Attaching devices are welded. (6) First vitreous enamel charge has been fused by firing. (7) Second vitreous enamel charge has been fused by firing. (8) The enamel colors are stoned smooth. (9) Enamel has been given a final fusing and buffing. (10) The plate is electro gold plated.

(1A) The metal is blanked from sheet stock. (2A) The design is coined. (3A) The excess metal is trimmed and holes pierced. (4A) Attaching studs are welded. (5A) The plate is buffed and chrome plated. (11) The two pieces are assembled. (12) Finished plate as passed by inspectors.



This is a typical example of a fine emblem, combining good design, excellent materials, and a high degree of art and craftsmanship in production.

It is almost always the case, though unsuspected by the general public, that the material to which a finish is applied has a definite influence upon the perfection and durability of that finish. For example, products that are nickel or chromium plated stand up better if the base metal is non-rusting, as is copper and brass. To take another example, look at vitreous-enameled emblems, used as trademarks, name plates, medals, lapel pins, insignia, and so on. Most of these emblems have a copper alloy as the base metal; only that, or gold or silver, can be used.

These emblems owe their beautiful and permanent colors to silicate pastes and powders, inlaid by skilled artisans, and twice fused in a furnace at a temperature of about 1500° F. This temperature sets high standards for the underlying metal which must not warp, nor "bubble up" into the enamel. Thus visible beauty for which so much creative skill is required, depends in part on the invisible metal underneath. Revere, which takes great pains to maintain the strict standards of its alloys, is proud to meet the high requirements of American Emblem and other companies in this field . . . Perhaps Revere can help you by supplying exactly what you require to protect the finish and durability of your product.

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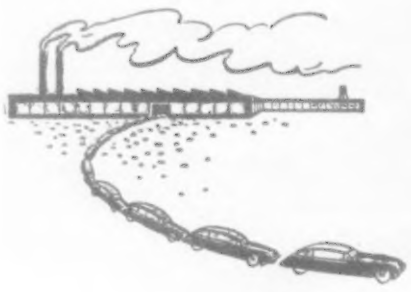
Assembly Line . . .

WALTER G. PATTON

• Auto industry continues peak production rate. Output in postwar period now tops 12 million . . . Sales outlook still good, Mr. Wallace says . . . Chrysler introduces new waterproof ignition . . . Labor restive in Detroit.



DETROIT—Last week the automobile industry assembled its 12 millionth car since production was resumed 4 years ago following the war. Except for an occasional break in automobile production caused by a heat walkout or workers protesting against disciplinary action taken against one of their members, the industry is humming. For the past week, Ward's has estimated the output of cars and trucks to be 116,878 in U. S. and Canadian plants. The total for the previous week is 146,-158 compared to 112,307 a year ago. Present production records are encouraging enough. And the sales picture isn't too bad either.

For example, at a press conference this week, David A. Wallace, president of Chrysler Div., said that another 4 years may elapse before the industry is actually back to the normal cycle of trading which saw cars move down from one price bracket to the next in an orderly manner so that it becomes necessary for dealers to sell three or more used cars for each new car going into the market. The Chrysler executive believes this condition will prevail in any normal auto market.

Mr. Wallace estimates there are nearly 12 million cars on the road today that need to be replaced—cars that would be junkers in a normal market. He said he sees no immediate slowing down in sales for Chrysler Div. cars and that even the higher priced Chrysler units continue in strong demand.

To hammer home a point that car inventories are still very low, Mr. Wallace showed the press a tabulation of the number of cars in the hands of Chrysler dealers. The most recent weekly check shows that 33 pct of all Chrysler dealers have no Chrysler models on the floor and half of 3400 dealers have no Plymouth models — not even a demonstrator. More than 70 pct have one car or less and only 2 pct have ten cars or more.

In the prewar era, Mr. Wallace said, it was fairly common for car dealers to average five cars per dealer and large dealers in big industrial cities might average more than 100 cars per dealer.

Mr. Wallace also denied rumors that have been circulating here to the effect that Chrysler has in mind any changes in its 1949 models. Changes in the 1950 models will be dictated for the most part, he said, by the extent to which Chrysler's competitors make changes in their models.

AT this week's press conference Mr. Wallace also showed the press two additions to the Chrysler line that will be introduced this week. One is a swank new Town and Country model convertible in which wood trim is mounted on an all-steel body. The car has interesting new telescopic steel members instead of the usual hinged members for rear deck supports.

Another new Chrysler offering is an all-steel station wagon. An innovation in the new design is an all-steel tire well and cover which is part of the rear door.

Under the hood of its new model, Chrysler has made two substantial engineering advances. The first improvement is a new oil filter that keeps oil clear and usable for at least 5000 miles. The second improvement is of greater interest, especially to car owners who have periodically experienced starting failures because of rain or moisture or a stalled car resulting from running through water collected on the highway. Chrysler engineers claim their new waterproof ignition system is entirely foolproof against such hazards.

To demonstate this point, a bucket of water was poured over the spark plugs, wiring and distributor. The running engine was thoroughly soaked with a high pressure hose. It never even coughed and started up easily after being stopped and soaked again.

At present Chrysler is the only passenger car offering an entirely waterproofed ignition system. Sparkplugs are inserted in a cadmium-plated steel bowl. A flexible neoprene rubber cap protects the terminal end of the plug. In addition to offering protection against moisture, the neoprene cap resists current leakage.

Completing the all-weather protection assembly is a distributor which has a bakelite cap and an exterior surface that is entirely free of index slots. Ventilation and drainage are provided by a hole in the base of the distributor.

The water-proofing design was developed by Chrysler engineers during the war and has now been made standard equipment on all Chrysler Div. models.

•

Detroit Labor Restive; Walkouts Idle Workers

Detroit

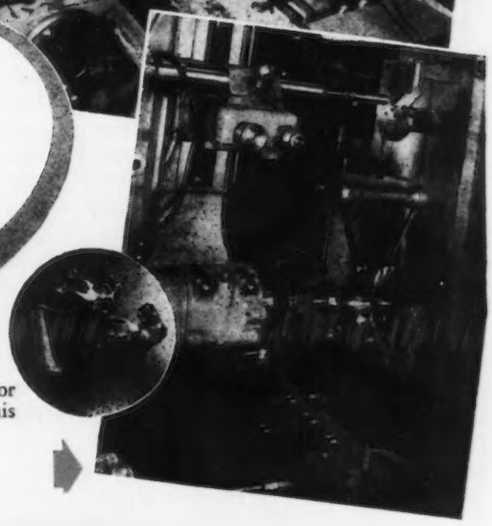
• • • **This week** it looked like the auto industry's headaches for the next few months would come from labor and not from the most widely-heralded source — faltering sales. Cars were being sold to customers ever so much more effectively than labor was being sold on the idea that this was not the year for boosting pay rates.

Although a stoppage at Ford may be avoided by a steel strike, there were plenty of other indications that Detroit labor is restive. Last week, for example, three walk-

Aircraft parts production on an experimental basis is swiftly and economically accomplished by Kellering such as this.

Another tricky part for experimental aircraft work. Imagine trying to produce parts like this in small lots by any other means. Kellering saves a terrific amount of time and money.

Small lots of aileron control cams are produced with accuracy and dispatch by Kellering.



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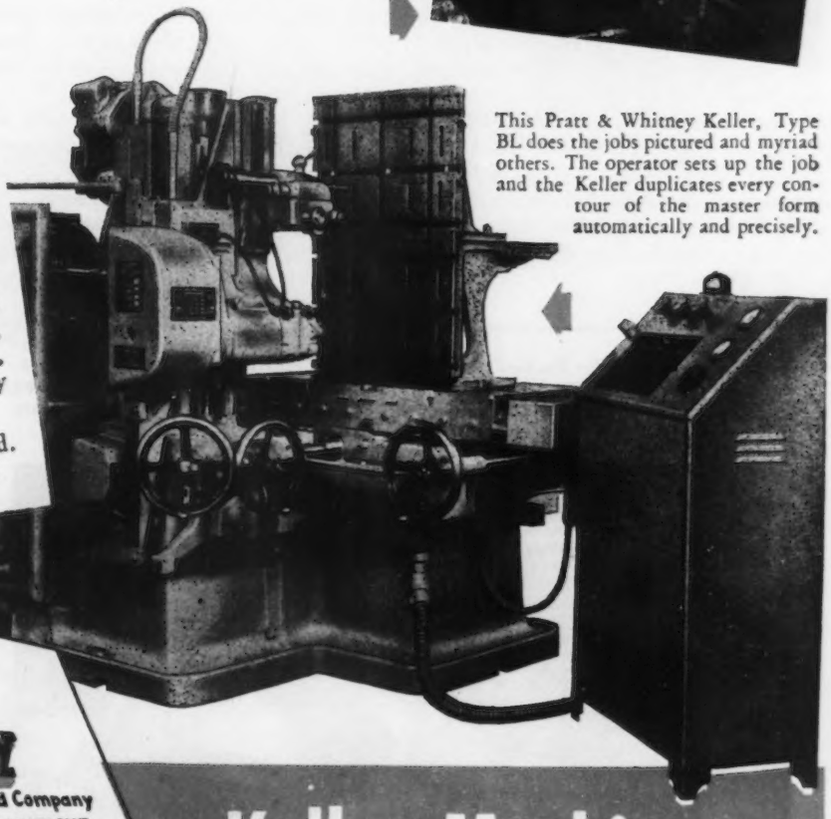

This Pratt & Whitney Keller, Type BL does the jobs pictured and myriad others. The operator sets up the job and the Keller duplicates every contour of the master form automatically and precisely.

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outs idled 35,000 auto workers. A typical example is Packard where nine men are reported to have quit working because of the heat. The company gave them their release. Subsequently, 14 workers in the body receiving department left their jobs to protest the company's action. The company wound up the incident by reinstating the men. However, as a result of the Packard shutdown, 4500 Briggs workers were sent home from its Connor plant.

Also, Briggs had labor trouble at its Mack and Meldrum plants. These breaks in production caused a shutdown at the Plymouth plant where 11,000 workers were sent home. Trouble is reported to have started at Briggs-Mack plant when workers complained that drill motors were developing short circuits. The union claimed one worker had to be treated for shock. The company contends it is using "the best tools to be had." A company spokesman said the shock was due to an accident and not to faulty equipment.

The second Briggs walkout this week resulted from dismissal of a foreman allegedly for fomenting a strike.

The auto industry trouble is unfortunately only the beginning of the problems Detroit is currently having with labor. This week, for example, Detroit Street Railway drivers staged a 1-day slowdown strike against bus schedules they insist are too fast. The union has agreed to restore the original schedules pending further investigation but thousands of Detroiters who were made late to work are probably more conscious this week of their dependence on the city's transportation system.

Adding to the growing list of protest strikes here — against the heat, speedup, and discipline in almost any form—is the threat that 4700 Detroit Edison employees may walk off the job July 17. The company has rejected a recommendation by a mediation panel calling for a 3 pct wage boost. The workers involved handle powerplant, substation and building operations and construction. The union involved is Local 233, Utility Workers Union (CIO). A 10-day cooling-off period is required under Michigan law. Union sources have scaled their original demand for a 10¢ wage boost to 9¢, it is reported. In addition to the wage demand, the union shop issue is involved in the dispute. At present the union has a maintenance - of - membership agreement with the Edison company.

Meanwhile, negotiations between Ford and the UAW-CIO are continuing during the union's Milwaukee convention. No important decisions are expected, however, and the present contract is continuing on a day-to-day basis.

It is now beginning to look as though there will be close cooperation this year between the UAW and the steelworkers' unions in pressing their demands for pensions, company-paid insurance and wage increases. In the event of a steel strike on July 16 — which nearly every one in Detroit expects —it is doubtful if the auto workers will go out unless a pattern is established that is quite unsatisfactory to UAW leaders. However, a prolonged steel strike will undoubtedly stop auto production.

While auto steel inventories are generally good—some plants now have a minimum of 60 days supply of most items. Most plants, it is believed, will be hit hard for some items even before 30 days have elapsed. Much will depend on the success General Motors has had in obtaining deliveries of August steel as early as July 15. Current reports indicate the company has had considerable success in speeding up its steel deliveries as a protective measure against a possible steel strike.

•

Ford Uses a Hot Press Diamond Setting Machine

Detroit

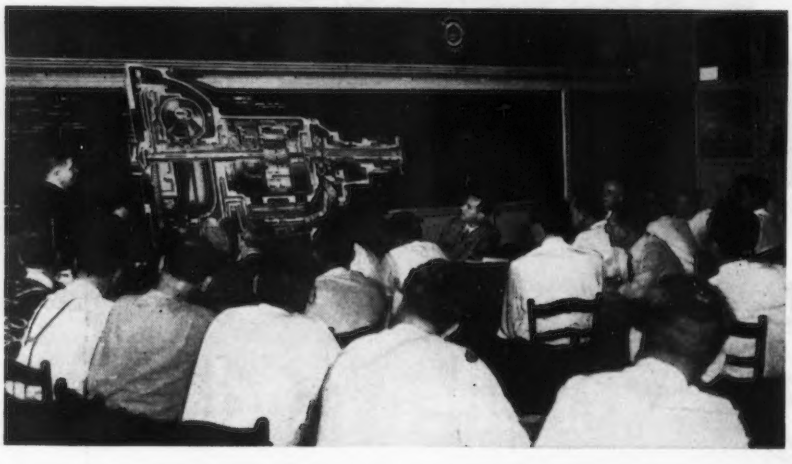
• • • **Ford is using** a Strauss Hot Press Diamond Setting Machine at the Rouge. The new machine consists of an arbor press and a ring burner. A hole is drilled at one end of the steel shank and powdered metal is placed in the hole. A small, pointed arbor is used to press the powdered metal into the hole. This leaves an indentation for the diamond. After the diamond is placed, additional powder is added. Another arbor which has been center drilled is then used for final pressing.

After the second pressing operation, the tool is placed in the ring burner. Silver solder is added and heated to a sufficient temperature to melt the solder and produce an even temperature throughout the powdered metal.

Previously, Ford had used the following method to set diamonds: A hole was drilled in the tool shank and the diamond placed in the hole. The steel shank was then peened around the edges until the diamond was set tight. Tobin bronze was then added with a welding torch. About 10 pct of the diamonds were fractured by the punch hitting the diamond and it was difficult to obtain proper setting of the diamond.

Ford engineers report considerable savings have been realized in diamond setting both for special jobs and resetting.

BACK TO SCHOOL: *Packard is holding regional classes in Detroit, New York, Chicago, Kansas City and Oakland, Calif. to explain the construction and functions of its new Ultramatic no-shift transmission. Service specialists from each Packard sales region attended the meetings.*



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Washington . . .

EUGENE J. HARDY

• Highways using more steel . . . Road program would cost $11 billion, use 6 million tons of steel . . . Much ado about nothing over so-called five-percenters.

WASHINGTON—Completing its work 6 months ahead of schedule, the Public Roads Administration has submitted to Congress, via the White House, a report on what the PRA estimates is needed to put the 40,0000-mile Interstate Highway System into condition to handle modern traffic.

This system is the so-called primary network involving about 38,000 miles of main roads with 2000 to be added. It connects 182 of the 199 cities of 50,000 population or more as well as hundreds of smaller municipalities.

Timing of the report has been perfect—first, in view of growing pressure for a reserve shelf of public works programs, ready to be dusted off for use if a recession definitely threatens; secondly, by beating the deadline set by last year's highway act, Congress is given several additional months to study the report; and, finally, from the viewpoint of the emphasis being centered upon national defense needs and planning.

The PRA estimates, on the basis of 1948 costs, that $11.2 billion, spent at the rate of not less than $500 million annually, will be required to improve the primary system sufficiently to carry modern traffic loads.

Also on the basis of 1948 requirements, the steel industry would be called upon to furnish between 5 and 6 million tons of road steel such as reinforcing bars, structural types and so on for road-laying purposes. This figure does not include steel for unestimated quantities of construction machinery and equipment.

Nor does it take into account the apparent trend toward increased needs for steel in modern highways. Within the past 2 years, such use of steel has risen more than 50 tons per $1 million in road expenditures.

This steel estimate might well be on the conservative side in view of the PRA findings that the lack of suitable bridging is a major deficiency of existing roads. Of the bridges checked outside city areas, only about 5 pct are termed suitable for meeting modern demands.

"All but about 2300 miles of the interstate system require improvement to bring these systems up to standards recommended for existing traffic," says the PRA. "Of 10,050 bridges checked, only 483 are completely adequate."

INAUGURATION of such a program is certain to encounter sharp Congressional debate, perhaps not so much in the way of how much money as in what way it is to be spent. That is to say, the question might be: Should the money be concentrated on primary roads?

Highway construction expenditures this year are expected to climb to the $1.8 billion mark and presumably will be spread equitably among all types of roads. The $11.2 billion program represents only the primary system or about 2 pct of the nation's total mileage—of which 700,000 miles are eligible for federal aid.

But the PRA holds that primary roads are of first importance, however, largely because of interstate aspects as well as importance to national defense. The agency goes so far as to suggest that in view of these facts, the federal contribution should be more than the "normal 50 pct" usually authorized.

As to the question of appropriations, it is difficult to picture a congressman from a grass roots district (that is, where roads are largely the secondary type) voting huge sums for primary roads building until a similar arrangement has been worked out for feeder types.

In this respect, a second report which will cover needs of the secondary and rural roads is under preparation. It will be ready for Congress when it convenes next January or shortly afterward.

Although not greatly discussed, the importance of a sound highways program as a hedge against unemployment and preventive of a recession has been well recognized in the Capital. Likewise, need for highway steel is seen as one of the props against a waning market.

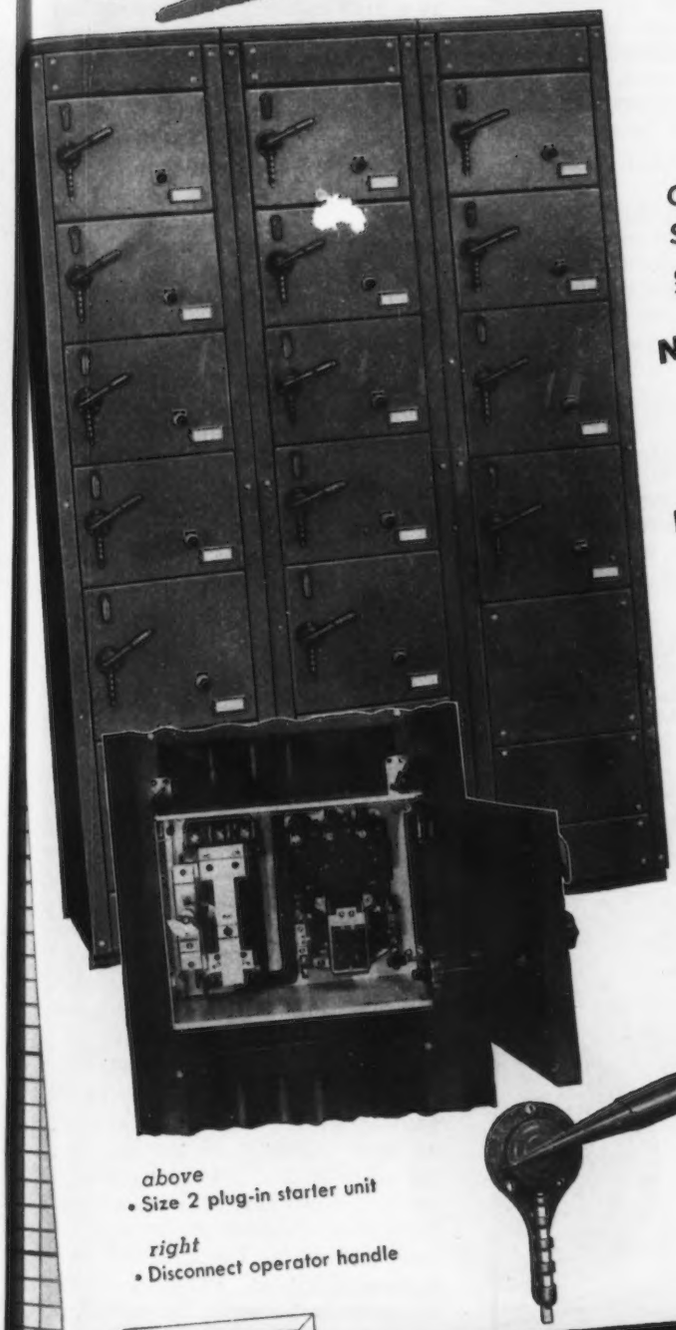
A point which will bear heavily in favor of pushing a primary roads program is that although making up only a minor percentage of total mileage, the bulk of heavy traffic moves over this basic network. And at the present rate of wear and tear of existing traffic loads, the PRA states that "all but the newest and the most durable roads will have to be replaced within 20 years."

* * *

THE recent furor over a former Army officer, now operating as a Washington management counselor, who was allegedly claiming "influence" in obtaining military contracts for his clients is reportedly causing a mild case of jitters among small businessmen who are represented by agents in the Nation's Capital. There is little need for trembling.

Army Secretary Gordon Gray has pointed out that there is "no mystery connected with doing business with the Army" and that claims of "influence" in obtaining

NEW SQUARE D "PLUG-IN" CONTROL CENTERS



above
• Size 2 plug-in starter unit

right
• Disconnect operator handle

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NEW INSTALLATION ECONOMY. Wiring channels are all accessible from front without removing units. Two big vertical channels per section permit separation of power and control circuits.

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NEW SAFETY DISCONNECT OPERATOR. One to four padlocks will lock both door and disconnect in either "ON" or "OFF" position. On closing unit door, handle moves to indicate position of disconnect. When not padlocked, authorized person with tool can release door interlock to inspect control without interrupting power.

NEW FLEXIBILITY. For simplest plant conversion or maintenance, plug-in units slide on guide brackets and positive pressure stabs grip round vertical busses. Plant conversion is simplified and minor changes often will not require shutting off power.

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government contracts are in direct conflict with Army policy.

Moreover, the secretary points out that to meet the needs of business, the Army has set up a Procurement Information Center in Room 4-E-789, The Pentagon, Washington, D. C. (Telephone, REpublic 6700, Ext. 4327). Information relating to current procurement, bids, location of purchasing offices, and so on, is obtainable there.

In a new procurement guide, issued just last week, the Army emphatically stated; "It is not necessary to employ agents, counsellors, advisors, or any agency, on a commercial basis, in order to obtain government business. Such persons or agencies cannot obtain government business for you which is not obtainable by you yourself through government channels. You should write direct to the appropriate purchasing office which handles your product or commodity."

Copies of this guide, entitled "Purchased Items and Purchasing Locations of the Department of the Army," may be obtained from the Procurement Information Center.

However, many small firms prefer to rely upon someone familiar with the Washington scene to supply them with information and to act as trouble-shooters for them in buying and selling activities. Any stranger to Washington who has tried to locate Col. Doakes in the Pentagon, or a War Assets official in the makeshift quarters off the Tidal Basin can quickly tell you why.

While the military, as well as other buying agencies, has bent over backwards to provide procurement and similar data to all firms, personal representation is almost a must at certain times. On such occasions, the red tape that binds official Washington defies snipping by letter or phone.

IN such instances, only a personal contact can iron out the difficulty. Some of the larger firms are able to maintain the expense of a Washington office for the purpose. For the small businessman, the going is rugged—and sometimes impossible.

However, it is not bona fide agents that the Army is striking at. Rather, it is the claims that such agents, seeking new clients, are able to influence contracts, Also, while it has been upheld by the courts, the practice of fixing fees as a percentage of the contract is frowned upon by the Army. Both factors were allegedly present in the recently publicized case of the so-called five-percenter.

All this fuss and fury has caused some small businessmen to believe they would be looked upon with disfavor by procurement officers if represented by an agent. This is a groundless fear.

As pointed out to THE IRON AGE by a high military procurement authority: "In line with the secretary's announced policy, it should not be necessary for anyone desiring to do business with the Army to employ a Washington agent. However, we shall continue to deal with bona fide sales or buying agents who are seeking legitimate information for their clients."

In other words, the Army prefers to do business direct but, like everyone else in Washington, recognizes the need of frustrated business men for assistance of some one experienced in threading the maze of the Pentagon or cutting the red tape that characterizes any government deal.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

W. A. Janssen Retires

Washington

• • • **Walter A. Janssen,** top adviser to the Commerce Dept. on all phases of the metals and minerals industries, retired recently after 42 years' service in industry and government.

Regarded as the outstanding man on metals and minerals in the Commerce Dept., Mr. Janssen's work was always rated "outstanding" by ranking government officials. In addition to his regular duties in the Commerce Dept., Mr. Janssen served many other agencies in an advisory capacity, particularly during World War II.

In 1933, he joined the NRA as deputy administrator in charge of a large number of mining and minerals codes. In 1938, he entered the Bureau of Foreign and Domestic Commerce where he later served as head of the Iron & Steel Division. Prior to his retirement last month, he served as consultant and adviser to the Office of International Trade and the Office of Domestic Commerce on all problems relating to metals and minerals.

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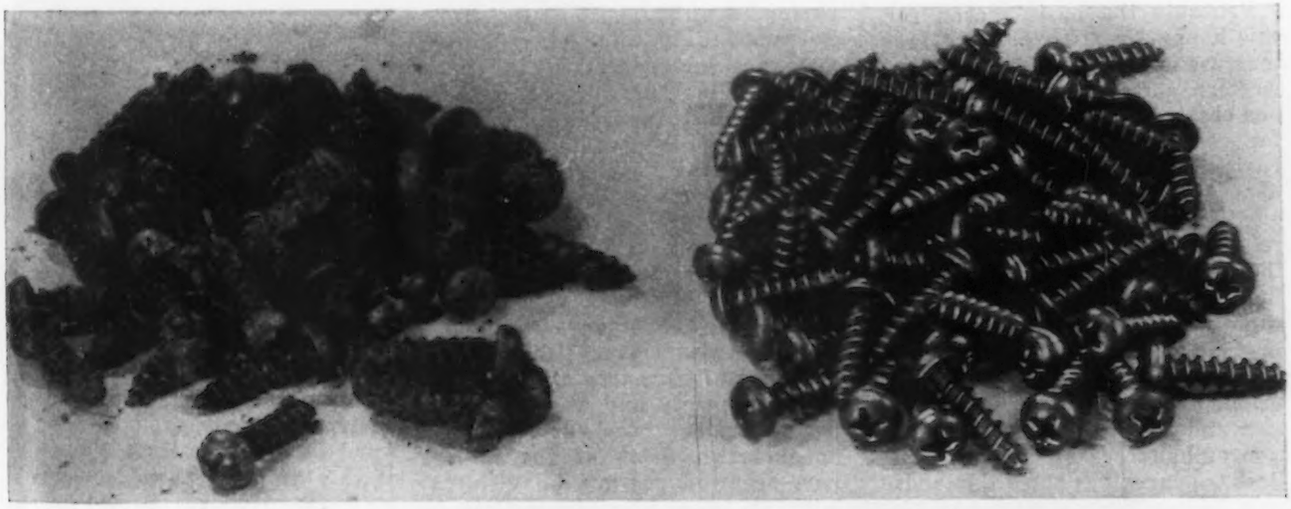


Threaded work carburized in Perliton "W" and oil quenched.

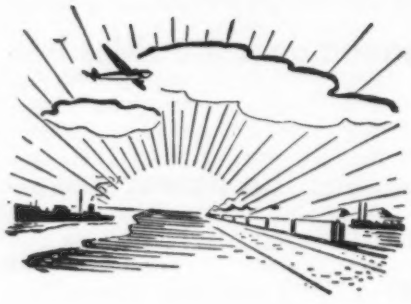
Same parts after washing in water. Salt readily removed.

HOUGHTON'S *Liquid* **SALT BATHS**

West Coast . . .

ROBERT T. REINHARDT

• Western steel producers and fabricators have reason for optimism although production admittedly is down . . . Pipe line fabrication is bright spot for some.



SAN FRANCISCO—While steel producers and fabricators in the West are complaining that business is not so good as they would like to have it, there is ample evidence to indicate that in general they are in a much more favorable position during this period of recession than their eastern and midwestern colleagues.

Probably the basic reason for this happy situation is the 41 pct increase in population in the seven western states since 1940 which has created new markets, not only for consumer goods but for the basic necessities of caring for the domestic and industrial requirements of so many people on such relatively short notice. To satisfy the demands of these newcomers, industry has expanded far more rapidly here than anywhere else in the country and necessitated huge expenditures for power alone which involves heavy construction and fabrication and installation of hundreds of miles of pipe lines to convey gas and oil. In addition, government expenditures in this territory are heavier than elsewhere and create large markets for steel in many forms.

The Los Angeles territory has already established itself as the nation's third largest manufacturing center in number of factories, taking the place of Philadelphia and following New York and Chicago. The 1947 census revealed that there were 9459 factories in the Los Angeles area and that San Francisco had almost 2000 factories and adjacent Alameda County about 1200 factories. In California as a whole there has been an increase of more than 6000 manufacturing establishments since 1939 not including those brought into production since the census of 1947. There were 246 primary metal industries established in that period between 1939 and 1947 and 839 fabricated metal producers.

Unquestionably this growth in industry accounts for the relatively healthy state of employment in the steel industry throughout the West, which in one case at least has a better employment record than during peak production in 1943.

In that year Columbia Steel Co. employed 6693 persons which included 400 at the Defense Plant Foundry, 550 at the Ironton, Utah, blast furnace and Columbia coal mines in that state. In April of this year Columbia employed approximately 6500 men in all departments at Pittsburg, Calif., and Torrance, Calif., and this figure does not include anyone at the Defense Plant Foundry or at the Ironton blast furnace. The DPC foundry is no longer in operation. In June of this year that company had 6107 on the payroll even though its own foundry had been closed for several months with a loss of 300 from the payroll.

IT is true that ingot production is down somewhat although at Torrance all furnaces are operating at capacity and at Pittsburg production has been cut to three openhearths. Some of the mills have been reduced to a 4-day shift but the largest portion of employees continue to work on a 5-day basis.

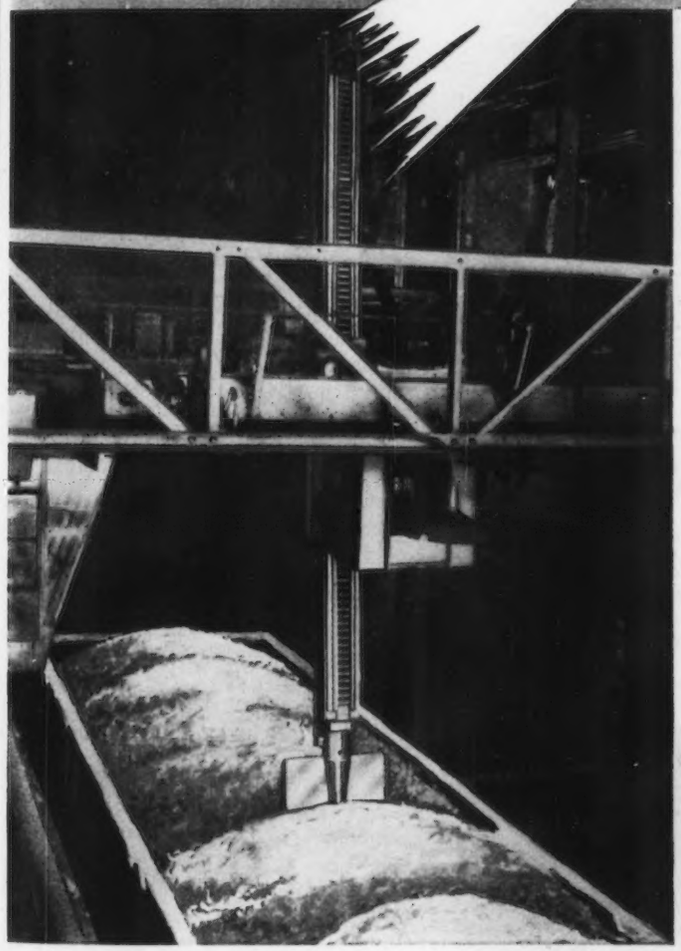
Other steel producers in the West report an overall employment of approximately 87 pct numerically of peak employment. Here again it must be admitted that there has been a reduction in the total number of hours worked somewhat below that 87 pct figure because many mills are operating on a 4-day basis. Bethlehem Pacific Coast Steel Corp. is operating two of its openhearths and electric furnace at Los Angeles, two openhearths at South San Francisco and three in Seattle. Most of this company's finishing mills are operating on a 4-day basis with the wire mill in Los Angeles running at capacity.

Geneva Steel Co. has closed down its structural mill in Utah which cut the payroll by about 90 men with the other half of the crew transferred to other departments. Plain lack of orders was given as the reason. The plate and hot coil mills are continuing to operate at capacity. Two of the three blast furnaces are under full blast and six of the nine openhearths are in full production. Overall employment at the Geneva plant is now at 4550 and in all of the company's Utah operations 6285.

In discussing the labor situation with steel producers it was repeatedly reported that one reason for the reduction in number of workmen was a much more efficient production record per man. This increase in efficiency was variously rated at from 8 to 15 pct.

Perhaps the truest picture of the actual employment situation in the iron and steel industry is reflected in the report of the California Dept. of Industrial Relations for the month of May which showed that while wage and salary workers in all manufacturing industries totaled 696,800 in May as compared to 701,300 in April, the drop in the iron and steel industry was only from 61,800 in April to 60,700 in May. A portion of this drop might be accounted for by local strikes as well as by a decline in orders.

Structural steel fabricators appeared to be among those hardest hit with employment now running approximately 60 pct of peak operations although construction employment in general in Califor-



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nia has increased slightly in May of this year but is well below the same month a year ago. This year for the month of May 181,900 were employed on all contract construction in the state whereas a year ago there were 204,500 on such payrolls.

AS unpleasant as these facts are, realists in the trade are accepting them as a part of the price of readjustment and there is little time wasted crying in their beer. On the contrary there are enough indications of stability at the present level with some signs of improvement to create something akin to optimism.

Fabricators of pipe lines for the conveyance of gas and oil, for example, are riding high, wide and handsome, as are the suppliers of plate. With a steadily increasing demand for natural gas and oil in the Pacific Coast territory it is apparent that pipe line production will continue to be an important factor in the steel business for many years. The Federal Reserve Bank of San Francisco reports that industrial use of natural gas has increased from 217 billion cu ft in 1936 to approximately 333 billion cu ft in 1947 and that total industrial use of fuel oil in the Pacific Coast territory has risen from 17 million bbl in 1936 to 50 million bbl in 1947. This is for the states of California, Oregon, Washington, Arizona and Nevada which, of course, are the principal industrial areas of the West.

Consolidated Western Steel Corp., U. S. Steel subsidiary, has a contract with the Pacific Gas & Electric Co. for 506 miles of .34-in. OD pipe which is said to be the largest diameter pipe line ever built anywhere for high pressure transmission of natural gas. The wall thicknesses will range from 5/16-in. to ½-in. and the inside diameter from 33.375 to 33-in. This job alone will require approximately 182,000 tons of plate.

The production schedule from the South San Francisco plant of Consolidated will average 20 miles of pipe per month. Manufactured in lengths of 29.9 ft the pipe is being trucked to the yard of the Bechtel Corp., construction contractor, where it is welded into double lengths and trucked to the construction site. Logging type trailers carry a total of 300 ft of pipe. This 506-mile section of pipe is a part of a 1600-mile line being built by Pacific Gas & Electric from fields in Texas and New Mexico to northern California at a cost of approximately $150 million.

ULTIMATE deliveries of gas will exceed 400 million cu ft daily and first deliveries are scheduled at approximately 150 million cu ft of gas per day to begin January, 1951.

Standard Oil Co. issued a call for bids on July 1 for the initial portion of a 560-mile oil products line to be built from Salt Lake City into the Northwest. The first leg of this pipe line spans 320 miles between Salt Lake City and Boise, Idaho, and will cost approximately $6 million. The line may later be expanded first from Boise to a terminal in western Washington on the Columbia River. The overall cost of this project is approximately $12 million. Eight-in. pipe will be laid as far as Boise but the pipe diameter for the remainder of the line has not as yet been determined.

Another project which promises heavy tonnage of plate for a 30-in. pipe line, 1400 miles long, is that proposed for bringing natural gas from Alberta, Canada, down into Washington and Oregon. At least two companies are planning this project and permission for its construction is pending before Canadian officials.

Bureau of Reclamation projects throughout the West are also affording heavy outlets for steel such as the award of an $11,000 contract to Consolidated Western of Los Angeles for furnishing steel for a bridge at Coulee Dam, Wash.

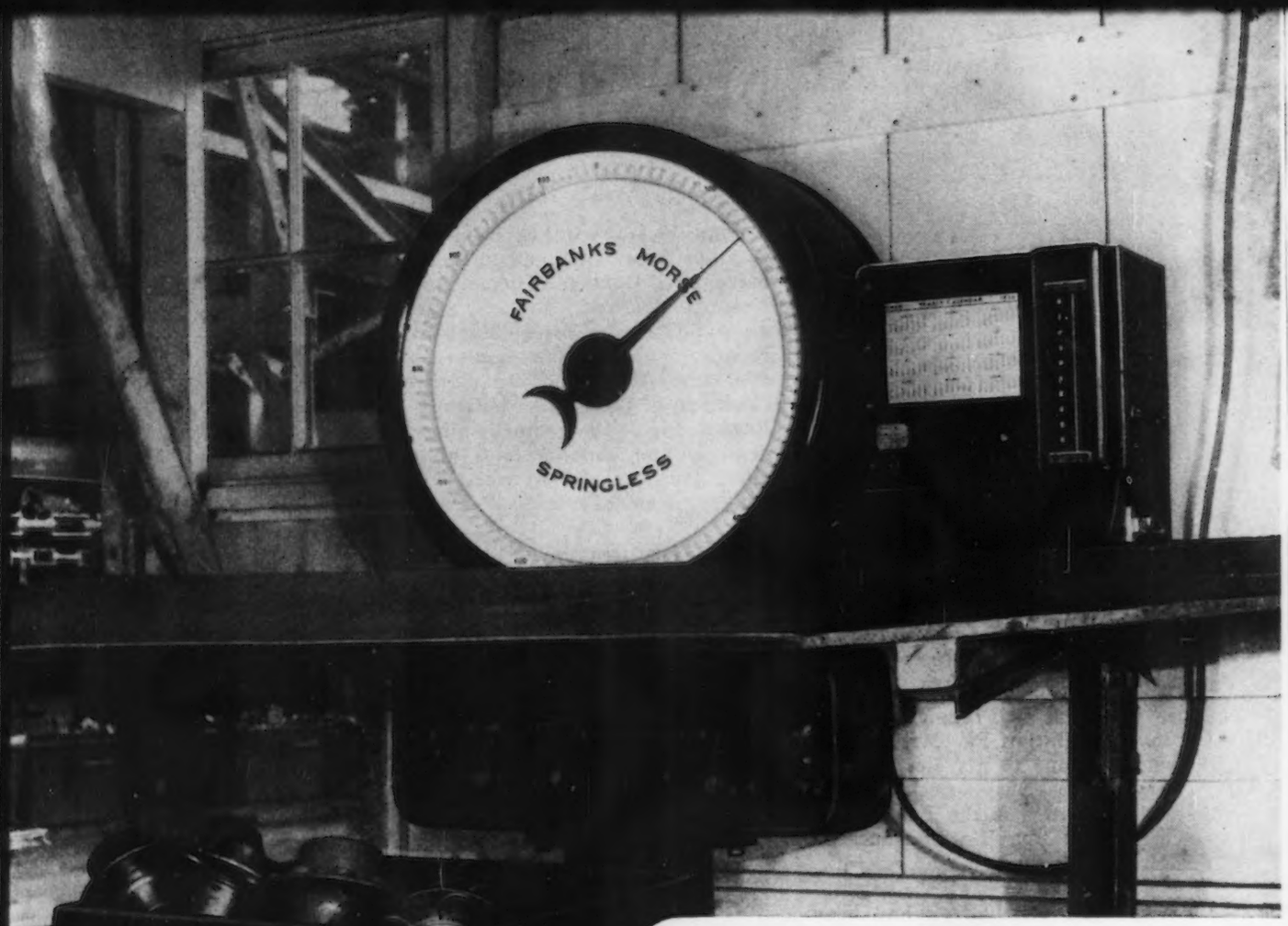
A considerable tonnage of "foreign" steel—from Barberton, Ohio—invaded California at Moss Landing last week when 47 cars containing 1318 tons of prefabricated boilers arrived from Babcock and Wilcox for installation at Pacific Gas & Electric Co.'s $51.5 million steam plant. This is the first shipment of this material which eventually will total approximately 6000 tons before the 402,000 hp steam plant is completed. This, the largest of the company's steam generators, is expected to begin operations in 1950 and be in full operation by 1952.

LET THERE BE LIGHT: *Better lighting not only prevents accidents but also helps to increase the efficiency of the worker. Bethlehem Pacific Coast Steel Corp. is completing installation of mercury vapor lamps in its open-hearth department at South San Francisco and although the work is still incomplete, company officials are enthusiastic about the improvement in working conditions. This installation is believed to be the only one of its kind in the steel industry.*

Cuts Payroll 10 Pct

Spokane

• • • **Lack of** business has brought about a 10 pct cut in the payroll of The Permanente Metals Corp., Trentwood Rolling Mill, which will mean a layoff of approximately 150 to 175 persons. Last winter at peak production the payroll was 2250.



Take the Wait Out of Weighing!

There's no hold-up of production with Fairbanks-Morse Printomatic Weighers. As an integral part of the materials handling system, these time-saving scales automatically record weights on a ticket or tape as material moves along the production lines. Printomatic Weighers can control materials handling flow, batching, processing and production machinery. Why not have a Fairbanks-Morse weighing expert show you how Printomatic can take the wait out of weighing in your plant? Fairbanks, Morse & Co., Chicago 5, Ill.

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PERSONALS

FRANK B. NIMMO, president, Fretz-Moon Tube Co.

• **Frank B. Nimmo** has been elected president of Fretz-Moon Tube Co., Inc., Butler, Pa. Mr. Nimmo, who previous to his election had served as executive vice-president and treasurer of the Lumsden & Van Stone Co., Boston, succeeds Dana Fox, who died.

• **Carl A. Mitcheltree** has been appointed assistant superintendent of the cold strip mill at the Midland works of Crucible Steel Co. of America, Pittsburgh. Mr. Mitcheltree had formerly been associated with the Youngstown Sheet & Tube Co. as superintendent of cold mills at their Indiana Harbor Works. **Donald E. Whitehead** has been appointed lubrication engineer for the company. He had formerly been employed by Carnegie-Illinois Steel Corp., in the same capacity.

• **Ralph Welles** has been appointed eastern district manager, Great Lakes Steel Corp., Detroit, succeeding F. L. Kennedy, who died. Mr. Welles continues to represent Hanna Furnace Corp., as eastern sales manager. Mr. Welles has headquarters in New York.

• **John W. Belanger,** assistant general manager of the apparatus department of General Electric Co., has been elected to the board of directors of Allegheny Ludlum Steel Corp., Pittsburgh, succeeding **Henry V. Erben,** a vice-president of General Electric Co., who has resigned his directorship in the steel company.

o o o

• **John J. O'Brien** has been appointed president and general manager of Gunnison Homes, Inc., New Albany, Ind., a U. S. Steel subsidiary. **Foster Gunnison,** founder of the company and president since 1935, has been elected chairman of the board. **William B. Eagles,** one of the company's first dealers, and general sales manager, has been elected vice-president in charge of sales.

• **George S. Grassmyer** has been appointed manager of inspection, Eddystone division, Baldwin Locomotive Works, Philadelphia. Mr. Grassmyer has been with Baldwin since 1941 and since that time has been connected with the field service and inspection department.

• **William H. Gantt,** assistant traffic manager, Bethlehem Steel Co., Bethlehem, has retired after 31 years of service with the company, starting as chief rate clerk in the traffic department.

• **Spencer M. Raymond** has been appointed director of purchases, Diamond Chain Co., Inc., Indianapolis.

• **Edward X. Tuttle** has been elected vice-president in charge of new business, Turner Construction Co., New York. Mr. Tuttle succeeds **J. P. H. Perry,** who continues as vice-president and consultant on new business.

• **Chapin Coit** has been appointed to the new position of assistant to the president of Hard Mfg. Co., Buffalo. He had formerly been associated with International Business Machines Corp.

• **T. M. Robie** has been appointed director of quality control for the Beloit, Wis., works Fairbanks, Morse & Co., Chicago. He has been succeeded by **J. W. Wright** as manager of the company's diesel division, with headquarters in Chicago. Mr. Wright had served as manager of the company's diesel engine sales department at the Kansas City branch since 1946. Mr. Robie has been with Fairbanks-Morse since 1919.

WALTER W. RECTOR, president, True Temper Corp.

• **Walter W. Rector,** formerly executive vice-president and general manager of the American Fork & Hoe Co., has been elected president of True Temper Corp., Cleveland, new corporate name of the American Fork & Hoe Co. **A. F. Fifield,** former president, has been elected chairman of the board. **J. C. Goddard,** vice-president and secretary, has been elected to the board of directors. **G. E. Dickinson** has been named vice-president, labor relations and **B. L. Brockelhurst,** controller.

• **Alex F. Osborn** and **Hamilton H. Wende** have been elected directors of the Rigidized Metals Corp., Buffalo.

• **Thomas H. Keating** has been appointed general manager of the Chevrolet Motor division, Detroit, of the General Motors Corp., succeeding **W. F. Armstrong,** who is on a leave of absence for reasons of health. Mr. Keating had been general sales manager of Chevrolet since 1945 and has been a member of the Chevrolet organization since 1916.

• **Frank Dowswell** has been appointed production manager of the roll forming division at the Trentwood, Wash., aluminum rolling mill of the Permanente Metals Corp., where he served as chief assistant to the roll form designer and developer, **Charles Kinghorn,** who has been transferred to Permanente's sales offices in Oakland, Calif.

SINCE 1846

BAIRD HIGH PRODUCTION MACHINES

• For producing articles made of wire, ribbon metal, castings, forgings or cut off bar stock.

• BAIRD 76H Chucker is an Automatic 7" Six Spindle, Indexing, Horizontal Lathe with different speeds available at the work spindles for different operations in the one handling of a piece and with other time saving features.

• BAIRD 54VC Lathe is an automatic 5" Four Spindle, Vertical Continuous Machine for many light or finishing cuts on parts, as facing ends or chamfering grooves on pistons, etc.

• BAIRD 12-Station Duplex Turning Machine is for such as turning the four trunnions on the "spider" or journals for universal joints and boring and facing the yokes of such joints.

• BAIRD Multiple Transfer Presses for multiple operation in one handling on articles made from ribbon metal.

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• BAIRD Four Slide Wire and Ribbon Metal Forming Machines in many sizes to cover the thousands of articles made from wire and ribbon metal.

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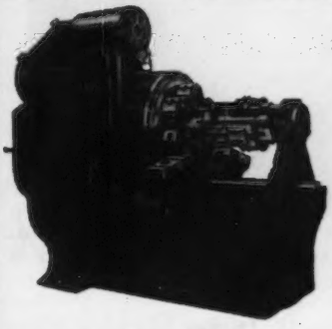
Send samples of *each article* you want to make in quantity.

State the quantities to be made of *each piece* you want to make in a given time.

Give electrical current specifications AND

Ask Baird About It

BAIRD 12 STATION DUPLEX TURNING



BAIRD 76H CHUCKING MACHINE

BAIRD 54VC LATHE

BAIRD MULTIPLE TRANSFER PRESS

THE BAIRD MACHINE COMPANY
1700 STRATFORD AVENUE
STRATFORD, CONN.

JAMES W. DICKEY, vice-president and treasurer, Cleveland Chain & Mfg. Co.

• **James W. Dickey** has been made vice-president and treasurer of the Cleveland Chain & Mfg. Co., Cleveland. Mr. Dickey has been connected with Cleveland Chain for the past three years. In addition to his duties at Cleveland Chain, he holds similar positions with the four associated affiliates of that company, viz., Bridgeport Chain & Mfg. Co., Bridgeport, Conn.; Seattle Chain & Mfg. Co., Seattle; Round California Chain Co., San Francisco, and Woodhouse Chain Works, Trenton, N. J. He also serves as a member of the board of directors of each company.

• **E. R. Oeschger** has been appointed manager of the newly-formed foundry divisions of the Apparatus Dept., General Electric Co., Schenectady. Mr. Oeschger had formerly been coordinator of foundry operations in the Apparatus Dept. He joined G. E. in 1948.

• **David W. Jones, Jr.,** has been named sales agent of LaSalle Steel Co., Chicago, covering the states of Colorado, Utah and Wyoming, with headquarters in Denver. Mr. Jones had formerly been associated with the U. S. Steel Corp. in Denver, Cincinnati and Chicago.

• **Gordon O. Davis** has been transferred from a sales position with U. S. Steel Supply Co. in Los Angeles, to office manager for the company in San Francisco.

• **James Ramsey** has been appointed foreman, replacing **H. A. Schenk,** American Steel Foundries, Alliance, Ohio. **Wallace Dixon** has been made time study supervisor, replacing **Edward Greenman.**

• **Thomas J. Williams** has been appointed sales engineer in the southwestern states by Edward Valves, Inc., East Chicago, Ind., with his headquarters in Tulsa, Okla. with the Rockwell Mfg. Co., the parent company. Mr. Williams had formerly been employed by Pate Drilling Co. and the Texas Co.

W. A. WALKER (left) vice-president, accounting, and director and JOHN D. BANVILLE (right), assistant treasurer, Carnegie-Illinois Steel Corp.

JAMES F. CLARK, treasurer, American Car & Foundry Co.

• **James F. Clark** has been elected treasurer of the American Car & Foundry Co., New York, succeeding **Lester A. Blackford,** who has retired after 44 years with the company. Mr. Blackford started as a clerk with the ACF St. Louis office, progressed in the treasury department, and was appointed assistant treasurer in 1917. He has held the post of treasurer since 1931. Mr. Clark joined the company in 1948.

• **W. A. Walker** has been elected vice-president, accounting and a director of Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Walker joined U. S. Steel in 1941 as a systematizer in the accounting department of Carnegie-Illinois and subsequently served in various capacities with that firm in the Pittsburgh district and at the South Works, Chicago district. In 1946 he joined the U. S. Steel Corp. of Delaware as audit supervisor, returning to Carnegie early this year as assistant to the vice-president, finance. **John D. Banville** has been named assistant treasurer of Carnegie, succeeding **Norris E. Crull,** who has retired after 40 years of service with that company. Mr. Crull was appointed assistant treasurer, western area, in 1942. Mr. Banville has been a member of Carnegie-Illinois since 1943 when he joined the organization planning division. He was appointed assistant supervisor of that division in 1944 and became assistant to the treasurer in 1947.

CHARLES S. CONRAD, director of steel sales, Tay-Holbrook, Inc. whose appointment was announced in the July 7 issue of The Iron Age.

• **Robert L. Lefevre** has been elected commercial vice-president of the General Electric X-Ray Corp., Milwaukee. Mr. Lefevre came to the company in 1930, and has successively held positions as sales representative, district manager, general sales manager, and marketing manager, before election to his new position. **Willard J. Cox** has been appointed to succeed Mr. Lefevre as marketing manager. Mr. Cox, who has been with the company for 19 years, had been assistant marketing manager.

• **Paul W. Pheneger** has been appointed assistant to the president and **W. B. Holt,** assistant to the vice-president in charge of operations, Superior Steel Co., Pittsburgh. Mr. Pheneger has been connected with the operating division of the company since 1947 and had previously been associated with Michigan Seamless Tube Co. **Karl W. Grube** has been appointed general superintendent and **S. S. Rickley,** chief engineer. Mr. Holt had been general superintendent. He has been with Superior 45 years. Mr. Grube joined the company in 1946 and had previously been connected with American Steel & Wire Co., Cleveland, and for the past two years had been superintendent of engineering and maintenance at Superior. Mr. Rickley has served in various capacities in the engineering department since 1945.

• **Dr. C. R. Payne** has been named president, **J. William Grant,** vice-president and sales manager, **William A. Sesher,** treasurer and production manager and **Walter L. Sheppard, Jr.,** advertising manager and export sales manager, The Electro-Chemical Supply & Engineering Co., Paoli, Pa.

• **H. W. Prewitt, Jr.** has been appointed manager of the Buffalo branch of Owens-Illinois Glass Co., Toledo. Mr. Prewitt has been with the company 19 years.

• **Charles A. Burton** has been appointed product sales manager of the lamp division of Sylvania Electric Products, Inc., New York, with headquarters in Salem, Mass. Mr. Burton joined the company in 1938 as a sales representative of the lamp division in the Milwaukee territory and since 1947 has been assistant general sales manager in New York. **Ross Gessford,** formerly engineering specialist in cathode ray tubes, has been named chief engineer for the television picture tube division of Sylvania. He joined the engineering staff of the radio division in Emporium, Pa. in 1937 and has been continuously associated with research, development and engineering of radio and cathode ray tubes since that time. **George R. Sommers,** formerly director of Pacific Coast sales for Sylvania has been appointed assistant to the general sales manager of the radio tube division.

THOMAS J. KEHANE, assistant vice-president and general sales manager, Worthington Pump & Machinery Corp.

• **Thomas J. Kehane** has been appointed assistant vice-president and general sales manager, Worthington Pump & Machinery Corp., Harrison, N. J., succeeding John J. Summersby, whose appointment as vice-president in charge of sales was announced in the June 30 issue of THE IRON AGE. Mr. Kehane has been with Worthington since 1915, starting as an office boy. He advanced through various positions in the sales department and in 1944 was named commercial vice-president Pacific Coast.

PAUL W. PHENEGER (left), assistant to president and W. B. HOLT (right), assistant to vice-president in charge of operations, Superior Steel Co.

GEORGE W. BINNS (left), and LESTER F. NENNINGER (right), vice-presidents and directors, Cincinnati Milling & Grinding Machines, Inc.

• **George W. Binns** and **Lester F. Nenninger** have been elected vice-presidents and directors of Cincinnati Milling & Grinding Machines, Inc., sales subsidiary of the Cincinnati Milling Machine Co. Mr. Binns became associated with the company in 1906 and had been active in the development of the grinding machine business and executive head of various departments. Mr. Nenninger started with the company in 1912 and since 1943 has been works manager.

• **David Edelstein** has been appointed scrap purchasing agent for the eastern territory of Federated Metals division, American Smelting & Refining Co., New York. Mr. Edelstein also serves as assistant to the general manager of scrap purcsases. He started with Federated in 1928. In 1936 he was appointed assistant superintendent of the Perth Amboy plant in charge of aluminum operations and was later placed in charge of scrap materials at that plant.

• **P. J. Mauck** has been appointed executive assistant for engineering on the general manager's staff, Fisher Body division, General Motors Corp., Detroit. **James H. Wernig** has been named to succeed Mr. Mauck as general director of the Fisher Body engineering division. Mr. Mauck has served Fisher 27 years. Mr. Wernig joined Fisher in 1936 as a draftsman.

• **LeRoy W. Howard** has been named sales promotion and advertising manager, Nineteen Hundred Corp., St. Joseph, Mich. Mr. Howard had formerly been regional sales manager. He has been with the company 7 years. **Jack D. Sparks,** who has been in the sales department for the past year, has been appointed assistant sales promotion and advertising manager.

• **George A. Greenamyer** has been named Philadelphia sales representative of Buffalo Stainless Casting Corp., Buffalo and American Aluminum Casting Co., Irvington, N. J.

OBITUARY...

• **John H. Kurlander,** head of the projection, photographic and miniature lamp section of the commercial engineering department, Lamp Div., Westinghouse Electric Corp., Bloomfield, N. J., died June 24.

• **William McKinney,** 64, director, E. W. Bliss Co., Detroit, died July 5.

• **Frank H. Powell,** 64, president, Southwestern Portland Cement Co., Los Angeles, died July 6.

• **George A. Caldwell,** 85, director of Mississippi Valley Structural Steel Co., Decatur, Ill., died June 9.

• **Frank H. Colladay,** 76, widely-known tinplate specialist who retired in 1947, Wheeling Steel Corp., Wheeling, W. Va., died June 17 in Greenwich, Conn.

• **John D. Berg,** 66, chief executive officer and a director of the Dravo Corp., Pittsburgh, died in Chatham, Mass., June 29.

• **E. W. Mudge,** 79, vice-president, National Steel Corp., director, Edgewater Steel Corp. and Stoner-Mudge, Inc., a prominent Pittsburgh industrialist, died July 1.

• **Charles M. Eaton,** secretary, Wheatland Tube Co., Philadelphia, died recently.

• **Harold C. Bullard,** 69, plant engineer, Bullard Co., Bridgeport, Conn., died June 28.

• **William M. Evans,** formerly sales manager, Brown-Lipe-Chapin Div., General Motors Corp., Syracuse, died recently.

• **Raymond D. Johnson,** 75, consulting hydraulic engineer and hydraulic valve inventor, died June 28.

• **Norman F. Harriman,** 76, former technical assistant to the director of procurement, U. S. Treasury, Washington, D. C., and author of many books on technical matters, metallurgical and engineering, died June 29.

• **George Rumble,** 48, formerly president of Lincoln Electric Co. of Canada, Toronto, June 27.

• **Joseph L. Dostal,** 65, president of Dostal Per-Mold Foundry, Pontiac, Mich., died July 1.

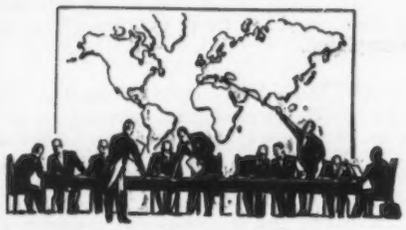
• **Edwin C. Shultz,** 51, advertising manager, Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn., died July 5.

• **Clifford R. Ramage,** vice-president and director of purchases, Diamond Chain Co., Inc., Indianapolis, died June 22.

• **Thomas J. Digan,** 59, vice-president and director, U. S. Steel Export Co., New York, died June 30.

European Letter . . .

• Italy facing formidable economic problems in recovery . . . Insufficient resources and small rate of capital accumulation partly responsible . . . Must increase internal markets . . . Improve productivity in industry and agriculture.



LONDON—The strike of the Italian farmworkers which, after considerable unrest, was settled recently, was caused by genuine grievances. The laborers on Italian farms are the worst paid of all workers, their average monthly wage is half the average in industry, and in most areas they are exposed to long periods of unemployment. In Emilia, for instance, a working year of 165 days is not uncommon. Their demands for better pay and more family assistance had a good deal of public sympathy behind it. The problem is how, in an economy as restricted and hemmed in as that of Italy, to secure a genuine increase in their share of the national income.

In many ways, the Italian economy has been well managed in the last 18 months. The deflationary policy introduced in the autumn of 1947 has been followed by a long spell of steady prices, steady wages and a steady cost of living index. The budgetary deficit has been drastically reduced, the value of the lira has remained constant and confidence in the country's money, which was vanishing in 1947, has been restored.

During the same period, production in industry has reached approximately the level of 1938 and agriculture does not lag far behind. In 1948 a really remarkable effort was made in the field of foreign trade, Italian exports registering an increase of 40 pct in the year. The result was an improvement in Italy's balance of trade from a passive balance of $788 million in 1947 to a passive balance of only $272.2 million last year.

IN spite of these genuine achievements, the Italian economy remains in a precarious state. To produce at all, it must import. If the recent oil strike in northern Italy proves genuine, it may ameliorate one of its great natural disadvantages—the absence of indigenous raw materials—but all other basic materials are absent. Imports in turn depend upon Italy's continued capacity to export and it is doubtful whether 1948's performance can be repeated in 1949. In the first three months of 1949, the high level of exports was maintained at 47 pct above the corresponding quarter of 1948, but in April both imports and exports began to fall.

The nature of Italy's exports increases the vulnerability. Europe's present tendency is to cut the imports of inessentials. Cheese, fruit, flowers, wine are among the first to suffer and they are all typical Italian products. The tremendous expansion in Italian exports of finished goods, particularly the products of mechanical industry, was made possible partly by the postwar shortages of these good, partly by the disappearance of German and Japanese competition. The restoration of western Germany may restore to some extent Italy's old exports to Germany of fruit and nuts and dairy products, but German exports may close some markets to Italian industrial exports. Difficulties have arisen in Italian trade with the sterling area. At present, the Italians have a sterling balance of 40 million lire. They blame this unbalance upon the over-valuation of sterling, which, last November, was fixed at 2,317.25 lire to the pound sterling in order to keep sterling in line with the dollar. But some Italians are also inclined to blame the severely restricted import policy pursued by Italy.

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ITALIAN industry cannot immediately offset any decline in exports by satisfying mass demand at home. There is no large internal market in Italy. In 1948, most consumer goods were selling at levels well below those of 1938 (60-75 pct for textiles, 65 pct for footwear, 60 pct for soap, 50 pct for new furniture), and in spite of idle capacity in the textile industry and unemployment among building laborers, virtually no programs for cheap textiles or cheap houses have been undertaken since the two Unrra-sponsored projects, *Unrra Tessile* and *Unrra Casas*, introduced three years ago. The picture is not much better for some production goods. In 1948 domestic purchases of tractors and machine tools were far below what was necessary for better and cheaper production and also below what could in fact have been produced by Italy's war-expanded mechanical industries.

This last shortcoming points to another weakness in the Italian economy, a weakness shared with other European countries, but particularly dangerous in Italy, where it has been fostered by decades of autarchy. Productivity in many branches of industry is low, and one of the reasons why the export drive of 1948 was possible was because many goods had priced themselves right out of the domestic market. So far, the modernization and reequipment of Italian industry have been undertaken only very patchily; and it is a complaint of the ECA mission to Italy that in 1946 and 1947 private industry, left to itself, far from renovating or installing plant, devoted a large proportion of its capital to building up speculative inventories.

The improvement of productivity in Italy faces one problem, however, which is absent in other

(CONTINUED ON PAGE 158)

• **STEEL LABOR**—With new contract negotiations "hopelessly" deadlocked, even after federal mediation efforts here by Cyrus Ching on Monday, whether there would be a steel strike apparently lay in the lap of the White House. Mr. Ching told the White House he could not bring the negotiators together. Philip Murray, USWA head, said that in lieu of a "satisfactory" agreement, steelworkers would begin walking out at midnight Friday with 500,000 workers out by Sunday. Other plants would be struck as present contracts expire. Steel representatives said no agreement could be reached as long as the union insists on negotiating for pensions. They said it was agreed last year that the matter was not to be brought up this year. In the meantime, Robert R. Nathan released a general economic study, charging that refusal of business to lower prices made necessary a fourth round of wage increases. Profits are now so large, he said, wage increases could well be afforded. On Tuesday, the second Nathan report, involving steel specifically, declared that the industry could raise wages 10¢ an hr, and though operating at 80 pct capacity, still earn profits at the 1948 rate—which the report placed at 12 pct. Should the operating rate rise back to 90 pct, the report said, a 20 pct pay boost would be possible and still enable steel to earn profits at the current 1949 rate.

• **ADDED CAPACITY**—Last week Allegheny Ludlum Steel Corp. started melting operations in a new 70-ton Swindell-Dressler electric furnace at its Brackenridge, Pa. plant. The furnace is the first to be completed at the company's new four-furnace electric melting department. A second unit of the same capacity is nearing completion and two 60-ton rebuilt furnaces are also being installed. When completed, the new department will have a capacity of more than 400,000 ingot tons of carbon steel annually.

• **EFFICIENCY**—Republic Steel Corp. this week blew out No. 1 blast furnace at Buffalo, leaving No. 2 in operation. For several weeks the two furnaces had been operated at 75 pct of capacity, but the company decided that full wind on the No. 2 stack would be more economical. Hanna Furnace Corp. also has blown out the second of four blast furnaces at Buffalo due to a slackening demand for merchant iron. The first stack was taken out for relining June 20.

• **NOT ENOUGH**—Inland Steel's bid for labor peace was rejected this week when the union turned down the company's proposal. Inland had offered a pension and insurance plan to which employees would help contribute. The company refused to consider any wage increases. Joseph Janeske, representing the union, termed both pension and insurance offers "inadequate." The union wants the company to pay the full expense of pensions and insurance and the union said that the insurance offer was 25 pct of what they wanted. Many had believed the union might accept Inland's offer as it is considerably more than they had yet been offered by other steel producers. At press time no further negotiations had been scheduled and both sides were starting to make preparations for a strike.

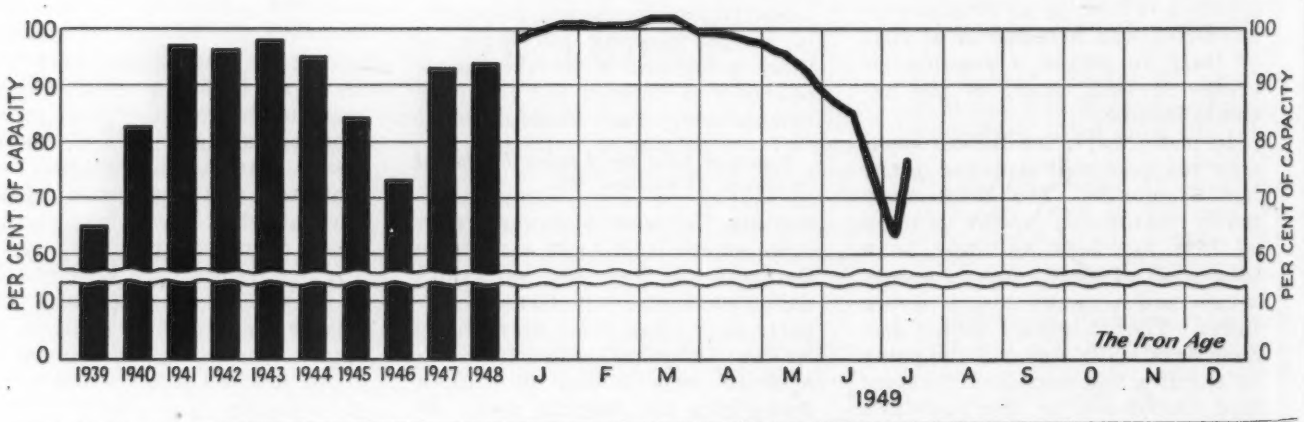
• **STEEL STRIKE BULLETIN**—The President's action in appointing a committee of public members to make a report on the steel controversy in 45 days may stave off a strike now. But if the report does not recommend something for Mr. Murray there still may be a strike. The fight may be bitter. Pressure from the White House will probably be placed on steel people to make concessions as soon as the report is completed.

• **REPUBLIC REPLIES**—This, said Republic Steel Corp.'s reply to its USWA negotiating committee, is no time to rock the boat. Business is too uncertain; 1949 wages can't be paid out of 1948 profits. Republic pointed out in its July 11th reply to the steelworkers that it will negotiate on jointly financed group insurance but considers a wage increase unwarranted and pensions not a proper subject for current negotiations.

• **PARTS HOLDUP**—It isn't typical automotive buying but it is happening: A small Detroit parts maker has 40,000 finished parts on hand ready for an automaker but the latter hasn't let him ship for several months. In desperation the parts maker appealed for a release and got one for 1500 parts. It is dated a week from now!

• **STAINLESS EXTRAS**—Allegheny Ludlum on July 7 and Carnegie-Illinois on July 11 met the average 30 pct reduction in stainless sheet polishing extras made by Armco July 1. Boxing and adhesive paper protection extras were also reduced on all these companies' stainless products. Allegheny Ludlum also met the lower extras on very thin gages recently announced by Washington Steel Corp.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
July 5	56.0*	66.5*	40.5*	70.5	60.5*	62.5	69.5*	103.0	77.0*	80.5	47.0	65.0	32.0*	62.0*
July 12	75.5	94.0	62.5	82.0	76.0	82.5	88.0	103.0	89.0	80.0	63.0	75.5	35.0	78.0

* Revised.

Industrial News Summary

- **Die Cast For Steel Wage Fight**
- **Economics Favor Steel Producers**
- **Detroit Steel Stocks Are Good**

THE die is cast in steel for a long fight. If the steelworkers don't strike late this week they may walk out later unless some sort of a concession is gained. Mr. Truman does not want a national steel strike and will do everything in his power to prevent one. He may have to play the last card before he is through—an injunction. The only thing that could prevent it would be a fact-finding report that would suit both the steel companies and the union. Chances of that are not good.

It looks as if the Administration has the hot potato of the steel wage demands right in its lap. Mr. Murray can hope that he will get favorable treatment. But this time the steel firms will buck harder than at any time since before the war against any attempt to raise wages, grant noncontributory pensions or agree to high social security demands. The economic pattern seems to favor the steel side with orders off, production declining and customers hammering at the price line. But the government finger in the pie may finally mean a compromise at some future date. That compromise will likely be spotted on fringe demands.

The situation in steel is radically different now than it was in 1946, 1947 or 1948 when wage increases were reluctantly granted. There are three major points of difference: (1) Steel demand is weakening every day; (2) higher wage costs will either mean higher steel prices or forestall the kind of cuts that may appear necessary later on to stimulate business; (3) price increases didn't hurt steel demand during the past few inflation years but they would be rough on business in the current deflation.

Both sides are fighting mad. It's going to be a game of prisoner's base—with clubs. If steel labor is going to get its long cherished social security gains it feels the time is now. And if steel is going to stop labor cost increases—at least for the current recession—it feels the time is now.

THE theory that a steel strike would so deplete steel users' inventories as to produce a boom in steel sales at the strike's end is partly wishful thinking. If basic steel is shut down many of its customers will also be struck by the Steelworkers' Union. The automobile industry, steel's No. 1 customer today, is an exception. The Big Three in Detroit have been putting pressure on their steel suppliers for weeks in efforts to build up inventories. They've been buying distressed sheet stocks and even purchasing big quantities from warehouses. As a result, most Detroit motor car plants have 30 to 60-day steel stocks on hand.

But the question of how long the auto industry can go in the event of a steel strike probably rests with its parts suppliers. Many of them have unbalanced inventories and may have to depend on their customers to bail them out in case of a long strike. This could lead to a mad scramble for certain steel items which might bring the automobile industry grinding to a halt. On the other hand it would clear up excess finished goods inventories now in the hands of automotive parts suppliers and return them to the market for steel at the end of the threatened steel strike.

The steel industry set up its schedules to operate at 78 pct of rated ingot capacity this week. This means the rate has snapped back by 16 points from last week's revised rate of 62 pct of rated capacity. Operations for the past 2 weeks were affected by the July Fourth holiday. The last nonholiday rate was that for the week beginning June 19, when the industry was able to run at 84.5 pct of rated capacity.

EXCEPT for oil well casing and drill pipe and oil and gas line pipe, where demand exceeds supply, the oversupply of most steel products is getting more obvious every week. Seasonal factors are still partly responsible. The effect of enforced F.O.B. mill selling is also getting more obvious, as the high Chicago and Birmingham operating rates now show. Elsewhere, mills are hoping for fast action on the O'Mahoney Bill to legalize freight absorption.

Steel sales executives are putting the polishing touches on their plans to plunge into markets now closed to them by F.O.B. mill selling. The big companies are ready to move just as soon as freight absorption is legalized—and that is expected soon. It will be a stiff competitive battle, with the steel buyer benefiting by competition on price, quality and delivery.

For the second successive week there was no change in THE IRON AGE steel scrap composite price. The steel strike threat is responsible. Despite this there was a strong undertone to the scrap market at Chicago, based on the theory that prices there are near the bottom and that some speculative stockpiling by large selling interests is in order. Elsewhere in the country some yards are taking advantage of distress scrap to lay down material at what looks like bargain prices.

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Steel-Union Contract Talks Break Off in Gloomy Atmosphere

Over Half a Million Workers Would Be Affected by a Strike; More Later

o o o

By JOHN B. DELANEY
Pittsburgh Regional Editor

o o o

Pittsburgh

• • • **With negotiations** between U. S. Steel Corp. and the United Steelworkers broken off indefinitely, there was a good chance of a steel strike though Washington action may at least postpone one for several weeks. Cyrus Ching, Federal Mediation and Conciliation director, called John Stephens, U. S. Steel's vice-president of industrial relations, and Philip Murray, union president, to Washington on Monday of this week (See p. 132).

On the basis of the corporation's reply to the union's demands on wages, social insurance and pensions, there appeared—early this week—to be little hope that the union's executive board and wage policy committee, meeting this Tuesday, could do anything but call for a walkout of the membership.

Under existing contracts, the Steelworkers, with few exceptions, have the right to strike July 16 barring agreement on wages and social insurance. The union contends that pensions also are wages. The executive board and wage policy committee meeting was scheduled to begin four days before the deadline.

A strike, if one is called, would affect immediately approximately 500,000 steel workers covered by 187 contracts, including almost every steel producer. Later, as contracts expire, an additional 250,000 workers in fabricating plants would be affected within 6 weeks. Other agreements covering 150,000 fabricating plant employees will terminate at various times after that.

The crisis arose July 6 when the corporation handed the following reply to the union at a 2½-hr negotiating session:

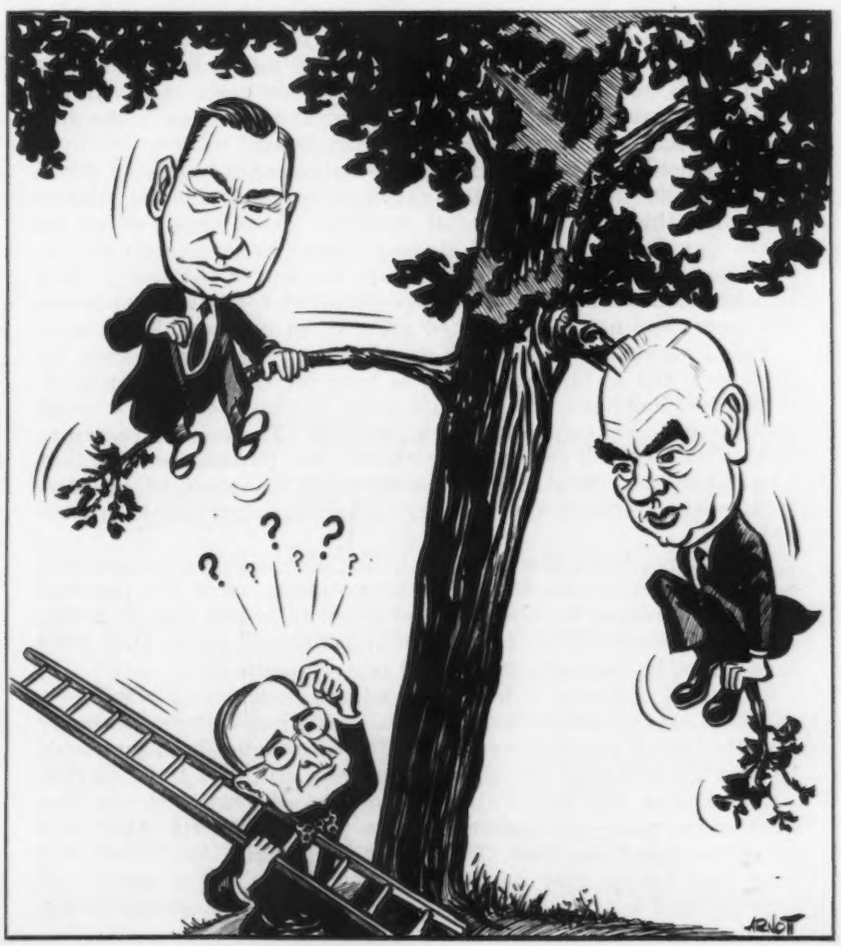
(1) To the union's demand for a "substantial" wage increase: "United States Steel firmly believes that there is no sound or proper justification for the granting by it of such a wage increase at this time." The company argued that with business and prices now on the decline "nothing could be more damaging to the economy of the nation than generally to increase labor costs at this time."

Mr. Murray replied that the company is not only in a position to grant a wage increase, but can do so without increasing prices.

(2) To the union's demand for group life, accident, health, medical and hospital insurance benefits to be paid for by the company: U. S. Steel offered to negotiate a plan under which both employees and the company would contribute. Mr. Murray characterized this offer as "niggardly." He said it would amount to 2 1/5¢ an hr for each employee, and would in fact constitute a wage cut of 2¢ an hr since employees would be required to match the company contribution. The union estimates existing social insurance benefits of U. S. Steel employees to be worth 1/5¢ an hr.

(3) To the union's demand for $150-a-month pensions: The company reiterated its position that the contract does not provide for negotiating on this question now, but offered to submit the matter to the Board of Conciliation and Arbitration as

Rescue?



provided in the contract. Mr. Murray, asserting that the company is morally, contractually and legally bound to negotiate, said the offer is a "meaningless gesture" because the chairman of the board (Ralph Seward) had been discharged at the company's request and the selection of a new chairman might take months.

The July 6 conference broke up in an atmosphere of gloom. Negotiations can be resumed only at the call of Mr. Stephens, U. S. Steel vice-president and conference chairman. Company negotiators spoke in subdued tones as they hurried to elevators on the 17th floor of the William Penn Hotel here. Inside the conference room, Mr. Murray, looking grim, was holding an impromptu press conference. He said:

"There is no hope, as I see it at the present moment, of a mutually satisfactory agreement being arrived at upon any of the issues. They (the companies) do not argue they are not in a position to allow wage increases or make available for employees decent pension or social insurance. They merely say, 'no'—and they say it with an air of complete finality."

Later, Mr. Murray issued a prepared statement in which he placed responsibility for the breakdown of negotiations on the company. He characterized a statement by Benjamin F. Fairless, U. S. Steel president, summing up the company's position as an "ultimatum" and deplored Mr. Fairless' absence from the negotiating sessions.

"Mr. Fairless' prepared statement was deliberately designed to break off negotiations with the union," Mr. Murray said. "The corporation's representatives at the conference stated that it represented the corporation's final position. This is an ultimatum to the union.

"Mr. Fairless himself at no time appeared or participated in the conferences. This is most unfortunate, since the union was deprived of the opportunity to present its case to the corporation's responsible head."

In his summary of the company's stand, Mr. Fairless stated that "the granting now of a further wage increase by United States Steel undoubtedly would encourage a general fourth round of wage increases throughout American industry." He added that higher prices would be the "inevitable" result of a general wage increase, which he claimed would only serve to accelerate the present business recession to the detriment of steel workers and a lot of other people.

Irresistible Murray Meets Immovable Fairless

o o o

By TOM C. CAMPBELL
Editor

o o o

New York

• • • **There is more** than an even chance that the current steel labor-management impasse will leave deep scars before settlement is reached. Words are beginning to fly from both sides which may forecast a bitter battle.

For the past several years labor has had things pretty much its own way. Wage increases have been made each year since 1946. Only the heavy demand for steel made it possible for steel firms to obtain higher prices to pay the increased wage costs.

Now the shoe is on the other foot. Steel customers not only take a sour look at any attempt to raise prices but they are balking on present prices. Steel people are well aware of this. That is why they are taking a strong stand against any wage concessions that will increase costs at this time. Time and again B. F. Fairless, U. S. Steel head, has said that higher labor costs mean higher prices. He usually follows up such statements—or has in the past—by raising prices when there is a wage boost.

Beneath the surface of this steel management policy is something ominous for labor and management in steel. The way things are going this week the cordial relations which have existed between Ben Fairless and Phil Murray appear to be severely strained. The current wage negotiations are the first in the past 3 years in which a meeting of the minds—personal contact between the two men—had not been reached prior to an inescapable impasse.

This time it looks as if both men have crawled out on their respective limbs so far that it will be hard for either to climb back. U. S. Steel has been opposed to a wage increase, excessive social security concessions and pension demands. There is no reason to think that they will change their minds. Mr. Fairless believes that labor should, at this time, cooperate with management by foregoing wage demands in an effort to halt the depression in steel orders.

Mr. Murray takes the stand that the falling off in orders is man made. He is also smarting after 2 years because of the pensions granted to miners working in steel company owned captive mines. Until he gets some kind of a pension award he will not let U. S. Steel forget how he feels about the coal mine agreement.

The steel industry side of the miners' pension is simple—to them. It was granted when John L. Lewis had the coal industry over the barrel, material was needed for Europe, no shutdowns could be afforded and steel and other items were still in a tight market.

Whether or not Ben Fairless and Phil Murray will—as they have in the past—get together at the last minute and stave off a crisis remains to be seen. This time the odds are that it may be a long time before they do this—if they do it. There may be no long strike due to governmental attempts to halt a serious strike.

GM Buys Tank Factory

Washington

• • • **In a cash deal** involving about $2.4 million, the General Motors Corp. has purchased the tank factory at Flint, which GM had operated for the government during the war.

The plant is subject to recapture under the National Security clause.

Advertising Manager Of Pratt & Whitney Dies

• • • **Edwin C. Shultz,** advertising manager of Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, died at his home on July 5, at the age of 51.

Edwin C. Shultz

After attending Massachusetts Institute of Technology and graduating from Stevens Institute of Technology he joined Pratt & Whitney in 1922.

Throughout the years Mr. Shultz had become recognized as a master of technical description and advertising layout, and was widely known in the industrial publishing field. He served with the Army during World War I and had been a prominent member of the Hartford Advertising Club and a director of the National Industrial Advertisers Assn., as well as a number of other organizations.

New Pulley Grooving Tools

Detroit

• • • **A new,** standardized line of solid cemented carbide blanks specifically designed for pulley grooving tools has been announced by Carboloy Company, Inc., of Detroit.

These carbide blanks—designed for the tools used in machining pulleys for A, B and C type V belts (both 34° and 38°)—are all available from stock. Blank thickness for all sizes is standard at 5/16 in.; length ranges from 1 in. to 1½ in.

Suspends Building Program

Chicago

• • • **Inland Steel's** modernization and improvement program has been temporarily suspended. Part of the program consists of major rebuilding of furnaces and the charging floor in the openhearth department. While in progress, Inland had only 34 out of 36 openhearths available. Now that the program is held up, they again have the full ingot capacity available.

Clarence Randall, president of Inland, told THE IRON AGE the program will probably not be resumed until about Labor Day. Last week when all other steel makers shut production over the holiday, Inland raised their rate to 109 pct. The average for the Chicago district, including Inland's high rate was but 68.5 pct.

Ask FPC Permission To Construct Gas Pipeline

Washington

• • • **Montana-Dakota** and Montana-Wyoming Gas Pipe Line Cos. have jointly asked Federal Power Commission permission to construct an $8.5 million natural gas pipeline project connecting Worland Field in Wyoming with Fallon County, Montana.

Involved is construction of 340 miles of 12¾ in. line pipe, two branch lines, and a combination compressor, dehydration, and sulfur removal plant.

Awarded Army Contract

New Orleans

• • • **Avondale Marine Ways,** Inc., has been awarded a contract of $135,480 to build 40 steel dredge pontons for the U. S. Army Engineers, Memphis district. These pontons are the standard dredge type 48 ft long by 18 ft wide by 2 ft 10 in. deep, equipped with pivot bearing stool and track for large dredge pipe.

Highway Steel Shipments Still Under Discussion

Washington

• • • **The section** of safety, Bureau of Motor Carriers, Interstate Commerce Commission, last week dropped the problem of safety regulation in highway steel shipping into the lap of the motor transport and steel industries.

At an informal conference on July 7, a committee was selected to work on the problem, meeting in Cleveland on July 18.

Unless a self-regulatory program and rules can be worked out that will be effective and acceptable to the ICC, it will be incumbent upon the commission to take action and issue formal safety regulations. The increased movement of steel by motor truck has resulted in a disproportionate increase in the number of accidents due to overloading, unsafe loading, and inadequate securing of loads, according to the ICC. (THE IRON AGE, June 30, 1949, p. 100.)

While the task committee is largely made up of carrier representatives, the ICC will be represented by Louis Reznek, in an advisory capacity. J. J. Kuhner of Assn. of Highway Steel Transporters is chairman. Also represented are two steel companies, American Trucking Associations, Inc., and the Truck-Trailer Manufacturers Assn.

Coming Events

July 11-16	**Concrete Reinforcing Steel Institute,** annual meeting, White Sulphur Springs, W. Va.
July 17-19	**Institute of Scrap Iron & Steel,** midyear meeting, Atlantic City, N. J.
July 20-22	**Pressed Metal Institute,** annual convention, Cleveland.
Sept. 12-16	**Instrument Society of America,** conference and exhibit, St. Louis.
Sept. 14-16	**Porcelain Enamel Institute,** annual forum, Columbus, Ohio.
Sept. 25-Oct. 1	**American Institute of Mining & Metallurgical Engineers,** midyear meeting, Columbus, Ohio.
Sept. 26-28	**National Electronics Conference,** Chicago.
Oct. 3- 5	**American Coke & Coal Chemicals Institute,** annual meeting, Skytop, Pa.
Oct. 4- 6	**Industrial Packaging & Materials Handling Exposition,** annual convention, Detroit.
Oct. 10-14	**American Society for Testing Materials,** West Coast meeting, San Francisco.
Oct. 12-15	**Electrochemical Society,** semiannual meeting, Chicago.
Oct. 13-15	**Foundry Equipment Manufacturers Assn.,** annual meeting, White Sulphur Springs, W. Va.
Oct. 17-21	**National Metal Congress,** Cleveland.
Oct. 24-26	**American Gear Manufacturers Assn.,** annual meeting, Chicago.
Oct. 26-28	**National Metal Trades Assn.,** annual convention, Chicago.
Oct. 27-28	**Gray Iron Founders Society,** annual meeting, Chicago.

Industrial Briefs . . .

• CONGRATULATIONS!—The 139th anniversary of the continuing production of iron and steel plate on the banks of Brandywine Creek, Coatesville, Pa., was observed recently by Lukens Steel Co. The company has been under an uninterrupted line of family ownership and management since its founding in 1810.

• ASME HEAD—James D. Cunningham, president of Republic Flow Meters Co., Chicago, has been nominated for president for 1950 of the American Society of Mechanical Engineers. Mr. Cunningham will succeed James M. Todd, consulting engineer of New Orleans.

• ALL IN ONE—The consolidation of the manufacturing and sales activities of the Dorman Machine Tool Works, Mt. Vernon, N. Y., with the Thriftmaster Products Corp., Lancaster, Pa., has been announced. The complete line of Dorman tapping attachments will be manufactured at the Thriftmaster plant.

• TOUR AWARD—Van M. Darsey, president, and Walter R. Cavanagh, development laboratory manager of Parker Rust Proof Co., Detroit, have received the Sam Tour Award of the American Society for Testing Materials for their paper, "Apparatus and Factors in Salt Fog Testing."

• GAINS TOOLS—The business of N. A. Strand & Co., Chicago, manufacturers of flexible shaft machine tools, has been acquired by the Balmar Corp., Baltimore, a wholly-owned subsidiary of Franklin Railway Supply Co., New York, and will operate as the N. A. Strand Co. Div. of the Balmar Corp.

• SALES OPENING—The Wolverine Tube Div. of Calumet & Hecla Consolidated Copper Co. has announced the opening of a new southeastern district sales office in Atlanta at 788 Spring St., N. W.

• INCREASING CAPACITY — The present facilities of Landis Machine Co., Waynesboro, Pa., manufacturers of threading equipment, are being increased by approximately 50,000 sq ft. They are also purchasing an appreciable number of new and more productive machines and tools.

• NEW QUARTERS—Federal Products Corp., Providence, makers of precision measuring instruments, has moved its Los Angeles branch office to new quarters at 1308 Magnolia Ave.

• TOOL AGENT—Appointment of Dolan Industrial Sales, 318 Union National Bank Bldg., Houston, as representatives in southern Texas has been announced by Michigan Tool Co., Detroit. Products to be handled include gear cutting tools, gear shaving equipment and Shear-Speed gear cutting machines.

• PRESIDENT'S TROPHY—Harry O. Lang, a vice-president of Heppenstall Co., Pittsburgh, and in charge of the sale of steel forgings in the Detroit area has been awarded the firm's President's Trophy. The award is given in recognition of outstanding effort in furthering the growth and development of the organization.

• BLISS DEALER—E. W. Bliss Co., Hastings, Mich., has announced the appointment of the Wegner Machinery Corp., 35-41 Eleventh St., Long Island City, N. Y., as its authorized service dealer in metropolitan New York, Connecticut and New Jersey. Wegner will rebuild Bliss presses in their plant or on customer's premises.

• PC DIRECTOR—Announcement has been made of the election of William Gillett, vice-president of Detroit Steel Products Co., to the board of directors of the Producers Council, the national organization of manufacturers of building materials and equipment.

Bethlehem Plans Added Capacity at Lackawanna

Philadelphia

• • • **Bethlehem Steel Co.** has announced its plans to go ahead with an expansion and improvement program at its Lackawanna plant near Buffalo. The program will double the present capacity for cold-rolled sheet and strip production at Lackawanna. The new facilities are expected to be in production by the end of the year, bringing the annual cold-rolled capacity of the plant to more than a million tons.

Market observers credit the expansion program to the fact that 40 pct of cold-rolled sheet consumption is in the East, whereas only 12 pct of the industry's production of this product is in the East. With freight rates as high as they are at present, there is no doubt that the additional capacity will not go begging for business.

The position of the Lackawanna plant on the Great Lakes will also afford low cost direct water transportation to the heavy sheet consuming Detroit market.

Decline in Employment Continues During May

Birmingham

• • • **Employment** in manufacturing industries continued the downward trend with a decline of 4500 from mid-April to mid-May.

Employment in May was estimated at 207,600, compared to 227,200 in May 1948.

In the month to month comparison, the sharpest decrease occurred in the primary metals industry where foundries and blast furnaces reduced work forces by 1300 and 700 respectively.

Making Smoke Detector

Chicago

• • • **Cardox Corp.** is now marketing a smoke detector which can readily be tied in through simple installation to actuate Cardox fire extinguishing systems. The equipment consists of a two stage detector, one which gives a warning signal, thus providing time to examine the premises and remove the smoldering material. If the smoking persists, the second stage operates the fixed fire extinguishing system.

British Industrial Experts Here to Study Simplified Practices

New York

• • • **Six industrial** experts from the United Kingdom arrived last week to start a month's study of simplified practices used in American industry.

The visit of the English experts has been arranged by the Anglo-American Council on Productivity in cooperation with ECA's Technical Assistance Div. The council attaches particular importance to the study-project because of the benefits that may be derived through standardization, simplification and specialization. The council points out that the adoption of simplified practices may result in lower costs and greater production by limiting the sizes or grades of products manufactured.

The visitors will hold discussions with U. S. government agencies, national professional organizations and trade associations and visit typical American firms where simplified practices are in effect. The group hopes to secure information on American achievements in this field, methods employed, degree of success and effect on productivity and cost.

On their return to England the experts will present a report to the Anglo-American Council covering their assessment of how far the American methods can be adapted to British conditions and the extent to which it would be of benefit to British industries.

The group will meet with representatives of important trade associations and professional societies, including the American Society of Engineers and American Standards Assn., and officials of the Simplified Practice Div. of the U. S. Bureau of Standards to complete details of their itinerary.

The group will be composed of the following: Maj. Gen. J. S. Crawford, director of Guy Motors, Ltd., vice-president of the Society of Motor Manufacturers & Traders and chairman of the society's standardization committee; C. A. Martin of British-Thomson-Houston Co., Ltd.; Robert Neill, a director of Joseph Lucas Electricals, Ltd.; G. Weston, deputy director of the British Standards Institution; Bertram White, technical director of the Federation of British Industries; and C. J. A. Whitehouse, secretary to the Ministry of Supply Committee on Standardization.

Predicts Return to Normalcy

Buffalo

• • • **"The U. S.** is fast returning to a more normal, competitive, balanced condition following the great war-caused inflation," said Bayard F. Pope of New York, chairman of the Marine Midland Corp., at the midyear board meeting here of the Marine Midland Group, Inc.

"Business, banking and industry have long anticipated this, and their preparation for it has been and will be a most important element in stabilizing conditions within healthy limits.

Pay for Laid-off Workers

Buffalo

• • • **Vacation pay** for about 250 employees of American Brass Co. who have been laid off since last Dec. 31 is provided in an agreement reached between the company and the CIO-Mine, Mill & Smelter Workers.

Laid-off workers with 1 year seniority will receive 2 pct of their gross earnings for the fiscal year ended last May 31, and those with 5 or more years of seniority will be paid 4 pct of gross earnings for the fiscal year.

Buyers of Overseas Government Scrap No Longer Restricted

Washington

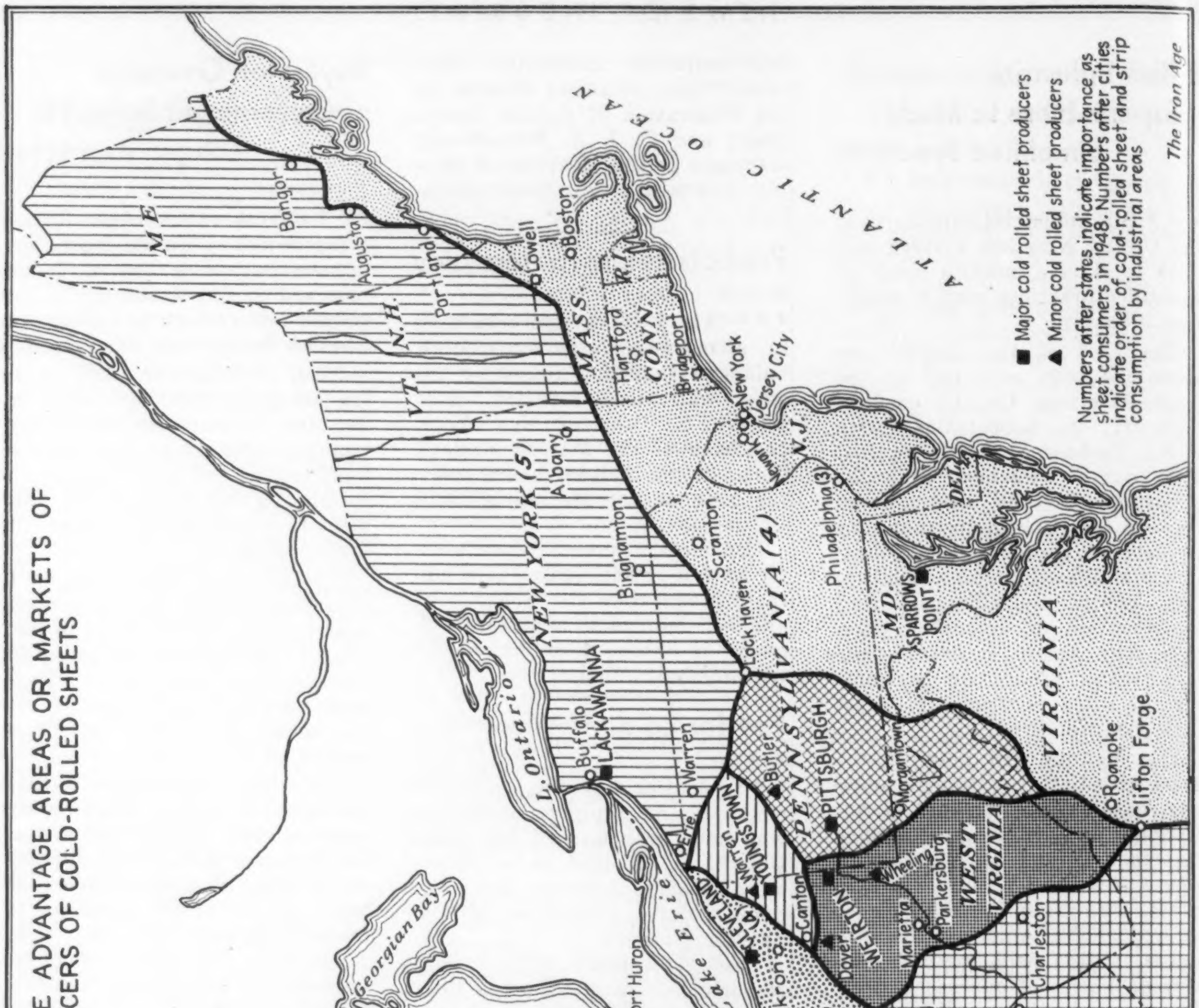
• • • **Buyers of** overseas ferrous scrap owned by United States government agencies are no longer required to ship the scrap to this country, Secretary of Commerce Charles Sawyer has announced.

Also, existing contracts covering scrap already purchased under the former destination-control provisions may now also be modified, at the discretion of the owning agencies, to permit shipment to countries other than the United States.

Consideration will be given to national security by the owning agencies, however, both in new sales of overseas scrap under the relaxed provisions, as well as in modification of contracts covering the resale of scrap already purchased.

The former destination controls on sales of United States-owned scrap abroad were placed into effect because of the acute shortage of all types of scrap in this country was a serious threat to increased domestic iron and steel production. Mr. Sawyer said that domestic scrap supplies are more plentiful, and iron and steel production is approaching balance with domestic demand making it no longer necessary to restrict sales of overseas scrap.

LET US SPRAY: A unique feature of a spray painting equipment school recently opened by Binks Mfg. Co. of Chicago, includes training classes to educate foremen, supervisors, salesmen, jobbers, and business executives in the latest spray painting methods and equipment. As part of the curriculum each member is provided with a spray gun which he takes apart, reassembles and demonstrates.


NATURAL FREIGHT RATE ADVANTAGE AREAS OR MARKETS OF MAJOR PRODUCERS OF COLD-ROLLED SHEETS
■ Major cold rolled sheet producers
▲ Minor cold rolled sheet producers
Numbers after states indicate importance as sheet consumers in 1948. Numbers after cities indicate order of cold-rolled sheet and strip consumption by industrial areas
The Iron Age
ATLANTIC OCEAN
ME.
N.H.
VT.
MASS.
R.I.
CONN.
N.J.
DEL.
MD.
NEW YORK (5)
PENNSYLVANIA (4)
WEST VIRGINIA
VIRGINIA
OHIO (2)
MICHIGAN (1)
INDIANA (6)
ILLINOIS (3)
WISCONSIN (7)
IOWA
MISSOURI
KENTUCKY
Bangor
Augusta
Portland
Lowell
Boston
Hartford
Bridgeport
New York
Jersey City
Albany
Binghamton
Scranton
Philadelphia (3)
SPARROWS POINT
Lock Haven
Buffalo
LACKAWANNA
Warren
Erie
Butler
PITTSBURGH
YOUNGSTOWN
Warren
CLEVELAND (4)
Canton
Akron
WEIRTON
Dover
Wheeling
Morgantown
Marietta
Parkersburg
Charleston
Roanoke
Clifton Forge
DETROIT (1)
Port Huron
Flint
Saginaw
Lansing
Grand Rapids (6)
Battle Creek
Jackson
Monroe
Toledo
Kalamazoo
Columbus
MIDDLETOWN
Cincinnati
Newport
Ashland
Louisville
Muncie
Indianapolis
Terre Haute
Kokomo
Ft. Wayne
CHICAGO
GARY (2)
Milwaukee (5)
Danville
Decatur
Peoria
Evansville
GRANITE CITY
St. Louis
Davenport
L. Ontario
Lake Erie
Lake Huron
Georgian Bay
Lake Michigan
Lake Superior

Freight Absorption Bill Demands Alert, Flexible Steel Selling

Analysis of Market Areas For Cold-Rolled Sheets Shows Difficulty of Task

o o o

By D. I. BROWN
Chicago Regional Editor

o o o

Chicago

• • • **Steel selling** under the new concept is going to be a tricky business, if the O'Mahoney Bill becomes law, as expected. Application of the former systems, whether right or wrong, were at least specific, unchanging and clearly understood. Not so in freight absorption. To meet competition in the broad sense means utmost flexibility, constant reconsideration and an alertness not heretofore needed.

Economists don't use the word competition without qualifying it. They describe this key to our economic life only in terms of "perfect competition," "imperfect competition," "monopolistic," "excessive" or "cutthroat," etc. Many economists plus some steel officials now believe we have reached the latter type of competition.

The accompanying map depicts how freight absorption type of competition works. The battlelines to be drawn in the cold-rolled sheet division of the industry are very definite. Such maps will vary with each product. At times the same map will have to be changed according to size of product. The map used here is only good for cold-rolled sheets, shipped via rail.

The black lines set off a natural geographic freight rate advantage area for each major producer of cold-rolled sheets. These areas are the only constant in the whole competitive cold-rolled sheet equation. With minor exceptions, the only way these areas could be changed would be the installation of a cold-rolled sheet mill not located in the producing cities marked by the black squares. Only the major mills have been considered but this is out of necessity for the limited discussion here. The location of minor producers are marked by triangles.

A change in freight rates won't distort the map, unless certain special rates are eventually evolved, because freight rate changes are usually on a simple percentage increase in all territories on all movements.

The map shows that each mill will have the same monopoly of area as it has under f.o.b. mill selling. This area is fixed by freight rates alone. However, the various advantage areas can now be invaded at will by producers elsewhere, through absorbing freight to meet the lower delivered price of closer mills.

With one exception, the areas are not corrected for difference in prices, as was the f.o.b. mill price map. (See THE IRON AGE, Jan. 6, 1949, p. 172.) The dotted line around Detroit portrays graphically Great Lakes Steel Co.'s present real market area and is based on their base price which is 20¢ a 100 lb more than that charged by most other mills.

This constriction of selling area is shown here because price competition will be based on a total, or delivered price. It is shown in order to illustrate what can happen in the dog-eat-dog fight ahead. The f.o.b. mill map previously mentioned precisely outlines how far Chicago, Cleveland and Middletown move into Detroit's natural freight rate advantage area because of price differentials on cold-rolled sheets.

The major sheet consuming states are numbered in descending order of tonnage used in those states in 1948, as determined by THE IRON AGE steel consumption study released earlier this year. (See THE IRON AGE, May 26, 1949, p. 73.) The number after certain large cities indicates the same measure of relative consumption on an industrial area basis, which was also disclosed in the steel use survey.

The small natural selling areas of Youngstown, Cleveland and Pittsburgh, mean these producers must invade the big sheet markets like Detroit, Philadelphia and elsewhere. It is also quickly evident that there are areas in which they would like to go but probably can't, as they soon reach a limit on how much freight it is practical to absorb.

Table I lists the carload freight rates from the major steel areas into most of the large consuming

TABLE I

Carload freight rates, finished steel products, based on min 40,000 lb loading.

From ➤ / To ▼	(Cents per 100 lb.) Chicago	Cleveland	Detroit	Granite City	Lackawanna	Middletown	Pittsburgh	Sparrows Point	Warren	Weirton	Youngstown
Chicago	6.25**			38		44					
Cincinnati		40	42	48		12.5	45	64	46	46	46
Cleveland		4.5***			36	38	31	56	16	30	21
Detroit	44	34	5*	57	40	39	46	65	39	46	39
Grand Rapids	36	44	33	55		44		71	48		48
Milwaukee	(1)		44	(2)		49		76			
New York City					53		56	38	61	56	61
Philadelphia					53		49	26	55	49	55
St. Louis	38			6.5**		49	68	78		68	
Toledo	40	30	18	57	46	34	40	62	36	40	36

* Average truck delivery
** Two-line switch
*** Usual multi-line switch

(1) Min 40,000 lb – 21
Min 80,000 lb – 14
(2) Min 40,000 lb – 44
Min 80,000 lb – 40

All above rates are subject to Emergency Increase in freight charges of 6 pct under ICC Ex Parte 168.

areas. Unlikely movements such as Pittsburgh to Chicago or Milwaukee, are not included. If business gets so bad that Pittsburgh has to sell in Chicago, then the other have-nots in Middletown, Granite City, etc. will be there first, for less.

The major engagements of the free-for-all are beginning in Detroit. This is a No. 1 sheet industrial area market and Michigan is a No. 1 sheet consuming state. At present Great Lakes is comfortably holding the small dotted area although other mills could penetrate this market. It is a battle of attrition so far as Great Lakes can make the invaders from Chicago pay 19¢, from Pittsburgh 21¢, from Cleveland 9¢, from Middletown 14¢, etc., see Table II. These freight costs do not include the 6 pct increase granted by ICC in Ex Parte 168.

If Great Lakes drops their mill price 20¢ a 100 lb to equal the invaders' mill price the attrition speeds up. The invaders then pay 39¢ from Chicago, 41¢ from Pittsburgh, 29¢ from Cleveland, 34¢ from Middletown, etc. The only encouraging feature to those aiming at Detroit is that the small area outlined uses more sheets than Great Lakes in the past could make. Until this is changed, or business gets terrible, Great Lakes will probably permit the invaders to come in—at a price.

Before looking at the other hot spots, it should be realized that the map is based entirely on carload freight rates. Actually then, much of the above is pure theory. Why? Because producers wanting to sell in Detroit aren't going to use rail if they can use cheaper methods. Much of the tonnage out of Chicago, Cleveland, Youngstown and Middletown, is crashing through the Great Lakes freight wall via truck.

Many of the mills are meeting or bettering Great Lakes delivered price by this method in the parts of Great Lakes' natural area from which that mill has retreated. Chicago, Cleveland and Lackawanna have and will continue to assail the defender from the rear via boat, and Pittsburgh can always, by rail to Conneaut and then by vessel to Detroit, annoy the local mill.

Because of these facts and many others too numerous to mention, Great Lakes' defense of the immediate Detroit area, or their whole natural freight rate advantage area, is fluid and uncertain. Thus, the map is useful only as a guide. From these basic natural restrictions, however, the mills will draw the rear battle plan now in effect or planned in the future.

Although the eastern sector of the cold-rolled sheet battle is interesting it lacks some of the features of the main arena. The dividing line in the east is somewhat academic. Freight into Lock Haven, Pa., is the same from Lackawanna and Pittsburgh, both of which are 1¢ less than from that of Sparrows Point. From there east the territory is divided between two plants of Bethlehem Steel Corp. Actually then, the line merely depicts which consumers should receive steel from Lackawanna and which from Sparrows Point in order to obtain the lowest delivered price. This assumes, of course, that the customer can receive the product he wants from either Bethlehem mill. However, Pittsburgh, Weirton and Youngstown will attack the big sheet markets in Philadelphia and Jersey City, Newark and New York City. Bethlehem's two pronged defense of their natural area is somewhat stronger than is the Great Lakes situation in Detroit because freight from Pittsburgh to Detroit is less than Pittsburgh to Philadelphia, New York, etc., see Table I.

Grand Rapids, Mich., is the sixth largest cold-rolled sheet consuming area in the country. Normally it belongs to the Detroit producers by 3¢ less than Chicago. Great Lakes by virtue of a higher price, however, has retreated from the borders of their natural advantage area to the closer confines of the dotted line, and thus have abandoned the Grand Rapids market to Chicago.

This difference in price is figured into actual freight absorption in Table II. It will be noticed that the actual freight absorption from other producers into the area Great Lakes has chosen to defend is not merely the difference between freight rates in Table I. Cleveland is the closest competitor by rail freight, with Youngstown, Warren and Middletown next. Because the Great Lakes base price is 20¢ higher, freight absorption by invaders of the Detroit market will be less than the various rates would indicate. From this total the Great Lakes delivery charge must then be deducted to arrive at the actual absorption involved from outside mills. The 5¢ per 100 lb charge is about the average trucking rate out of Great Lakes' Ecorse plant into the immediate Detroit area.

Under the f.o.b. mill system the producers are saddled with the single mill net base price which can not be changed to one customer without changing it to all customers. Under the O'Mahoney Bill price cuts to individual ac-

TABLE II

Least possible freight absorption on CR sheets from mills to various consuming areas based on rates shown in Table I. This absorption takes into consideration different mill prices now in effect and includes the switching charges assumed in Table I.

(Cents per 100 lb.)

From →		Chicago	Cleveland	Granite City	Lackawanna	Middletown	Pittsburgh	Sparrows Point	Warren	Weirton	Youngstown
To ↓	Area Rating										
Chicago	(2)	None		51.75		37.75					
Cincinnati	(Minor)		27.5	55.5		None					
Cleveland	(4)		None		31.5	33.5	26.5	51.5	11.5	25.5	16.5
Detroit	(1)	19	9	52	15	14	21	40.5	14	21	14
Grand Rapids	(6)	None	8	39		8			12		12
Milwaukee	(5)	None		46		35					
New York City	(8)				15		18	None	23	18	23
Philadelphia	(3)				27		23	None	29	23	29
St. Louis	(Minor)	11.5		None		22.5	41.5			41.5	
Toledo	(Minor)	2	None	39	8	4	2	24	6	2	2

Note—A total of each mill's absorption into major markets to a degree indicates its overall competitive position. Notice Chicago's total absorption into four of the six largest industrial areas compared to Pittsburgh's total into but three of the six largest sheet consuming points. Amount of absorption into each consuming point places competitors in their relative ability to service each market. For instance, after Great Lakes in Detroit is Cleveland second, Middletown, Youngstown and Warren tied for third, etc.

counts, when done in "good faith" can be granted to meet a competitive situation. It is conceivable that outside mills may have to do this to hold accounts in the Detroit market. Invaders will try trucks first, water second and absorb the full freight on each method. By water Chicago can equal Great Lakes present delivered price into the city of Detroit right now. Cleveland and Lackawanna can do about the same.

Detroit buyers are normally tough. In the months ahead Great Lakes may find they are losing more business to outsiders than they feel they can afford to lose and then the fun will start. If Great Lakes dropped their base price to $4 to equal that of the invaders, the outside mills would be faced with absorbing not only the full freight but cutting prices to certain Detroit consumers as well.

Another example would be a Granite City invasion of the Chicago Territory. To get into the switching area, and equal Chicago mills delivered price, they would have to absorb first the full 38¢ freight less the 6.5¢ two-line switch, plus a 20¢ cut in their present base price. Their entry into Milwaukee is easier as here they only have to absorb 46¢, 40¢ of which is pure freight, the other 6¢ a reduction in base price.

In Table II, some idea of each mill's competitive situation can be estimated by comparing the total freight absorption with the full market potential of cold rolled sheets and strip in the various big consuming centers obtained through THE IRON AGE survey. Chicago mills have a potential of 3,059,728 tons of cold-rolled sheets and strip in the areas listed with but 32½¢ total freight absorption. Pittsburgh has a potential of 2,915,195 tons to the points shown in Table II, but her total absorption is $1.32. These figures can't be precisely compared, as in themselves they mean nothing, but the ratio of one to other indicates the disadvantages of steel production in Pittsburgh with the big markets so far away.

Pittsburgh, however, has an out. By barging down the Ohio and using trucks from certain depots they can invade Middletown, Chicago and Granite City markets at will. If included in the map this swathe would extend along both sides of the Ohio and Mississippi Rivers for a depth ranging from 50 miles to 150 miles in Ohio, Indiana, Illinois, Kentucky and Missouri, and much over this depth further downstream.

Steel men can't go back to the arbitrary freight used in the basing point days as such a system is still plainly illegal. The key to multiple basing point selling was the AISI freight rate book and arbitrary rates, including arbitrary switching charges. Without these agreements the old basing point system wouldn't have worked. It won't work now any better than before, and the mills that experimented with different systems in the old days were driven to arbitrary freight charges as a matter of self protection. They found out then that pure outright freight absorptions based on actual rates were too detailed, too burdensome and too costly.

This is but a preview of competition as we have it today. It is not the controlled competition the industry knew in the basing point days. What kind of competition it is according to the economist's classical definition, depends on whom you ask to define it.

House Passes Freight Absorption Bill

Washington

• • • **The year-old** congressional battle to legalize freight absorption neared its end this week.

The House of Representatives, after accepting an amendment to limit the "good faith" defense to cases not otherwise prohibited by the Clayton Antitrust Act, passed the O'Mahoney Bill (S 1008) to legalize good faith freight absorption.

The bill passed by the House is somewhat more favorable to business than that passed by the Senate. The Senate-passed bill contains the so-called Kefauver Amendments, which would completely remove good faith as a defense in cases where freight absorbtion might tend to lessen competition.

The amendment to the House bill, sponsored by Representative Carrol, D., Colo., declares freight absorption illegal if its effect upon competition can be construed as being prohibited elsewhere in the Clayton Act.

Representative Walter, D., Pa., told THE IRON AGE he was "well satisfied" with the House-passed version of the legislation. "I think we've got a good bill," he declared. "Heavy goods industries should now be able to absorb freight without fear of prosecution from the Federal Trade Commission."

These differences between the Senate and House versions of the legislation are being resolved. The bill is scheduled to go to the White House for President Truman's action late this week. Most Congressmen are confident that Mr. Truman will follow the recommendations of the Justice Dept. and the Federal Trade Commission and will sign the bill into law without delay.

The steel industry as a whole fared well—for a change—during House debate on the measure. Representative Fulton, R., Pa., declared that "the most remarkable thing is that there has been no criticism on the floor of the House by any congressman of the management of the iron and steel industry."

"Obviously, the steel industry in the United States is being managed efficiently, and its high labor productivity is satisfactory to the American people," he stated.

Meanwhile, FTC's suit against rigid steel conduit manufacturers took a new turn last week. The commission denied a request from the industry for modification of the cease-and-desist order issued by FTC.

The industry had asked FTC to rewrite the order so that freight could be absorbed on an independent basis by individual manufacturers. FTC refused, industry spokesmen then declared they would ask the Seventh Circuit Court of Appeals to stay the commission's enforcement order which became effective July 9.

ECA Authorizes $500,000 For Machine Tools

Washington

• • • **A dribble** of $500,000 worth of machine tool procurements were authorized recently for delivery to ECA countries over the next 9 months. This amount was cut in half by cancellation of $250,000 in previous procurements scheduled for first half delivery.

Italy was authorized to buy $150,000 worth for fourth quarter delivers and $237,000 worth for the first quarter 1950, plus $77,000 worth of other types of metalworking equipment.

Procurements authorized for Austria amounted to $16,000 for the third and $50,000 during the fourth quarters. About $37,000 worth is scheduled for 1950 first quarter delivery.

Develops New Couplings

Chicago

• • • **A new line** of stock silent chain flexible couplings has been developed by the Morse Chain Div. of Borg-Warner Corp. This series, designated at DSC, features all steel construction combining maximum power transmission capacity with minimum space requirements.

The design is simple with two sprockets wrapped with a center guide Morse silent chain which can be disconnected quickly by either unwrapping of the chain after removing the single connecting pin, or by moving either sprocket endwise out of mesh with the chain. Stock bores range from ½ in. to 2⅞ in. with horsepower capacity up to 119 hp at 2000 rpm.

AMERICAN IRON AND STEEL INSTITUTE

SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING ALLOY AND STAINLESS
(Net Tons)

MAY - 1949
Month

Steel Products	Number of companies	Items	Current Month: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	Current Month: Per cent of Total Shipments	Current Month: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)	To Date This Year: Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale) (Net Tons)	To Date This Year: Per cent of Total Shipments	To Date This Year: Shipments to Members of the Industry for Conversion into Further Finished Products or For Resale (Net Tons)
Ingots, blooms, slabs, billets, tube rounds, sheet and tin bars, etc.	47	1	202,321	3.9	180,082	* 1,347,376	4.7	*1,229,710
Skelp	5	2	7,590	0.1	46,271	38,758	0.1	208,090
Wire rods	20	3	43,287	0.8	20,113	259,948	0.9	119,305
Structural shapes (heavy)	11	4	377,743	7.2	1,890	1,863,626	6.6	13,363
Steel piling	3	5	30,365	0.6	333	143,932	0.5	1,325
Plates	28	6	589,596	11.3	17,111	* 3,107,637	10.9	112,890
Rails—Standard (over 60 lbs.)	4	7	180,392	3.4	1,043	887,220	3.1	4,674
Rails—All other	5	8	12,325	0.2	164	71,648	0.3	1,178
Joint bars	7	9	10,416	0.2	4,531	57,213	0.2	18,646
Tie plates	6	10	41,085	0.8	-	208,350	0.7	41
Track spikes	8	11	10,370	0.2	-	55,073	0.2	35
Wheels (rolled or forged)	5	12	28,383	0.5	81	149,347	0.5	497
Axles	5	13	17,543	0.3	3	99,014	0.4	17
Hot rolled bars (including light shapes)	39	14	596,829	11.4	73,961	* 3,391,916	11.9	358,161
Hot rolled bars—Reinforcing	24	15	133,567	2.6	466	692,809	2.4	2,241
Cold finished bars	33	16	107,745	2.1	231	* 675,679	2.4	3,874
Tool steel bars	17	17	4,308	0.1	23	* 29,418	0.1	414
Pipe—Standard	16	18	198,578	3.8	4,480	987,613	3.5	24,707
Pipe—Line	12	19	186,934	3.6	1.534	987,592	3.5	9,905
Pipe—Oil country goods	14	20	143,469	2.7	7,354	667,650	2.4	40,218
Tubes—Boiler	3	21	10,642	0.2	520	54,375	0.2	4,748
Tubes—Mechanical and pressure	21	22	57,643	1.1	1.265	349,217	1.2	9,274
Miscellaneous pipe (including conduit)	12	23	21,232	0.4	109	122,686	0.4	955
Wire—Drawn	37	24	153,017	2.9	10,158	1,020,260	3.6	65,696
Wire—Nails and staples	17	25	72,670	1.4	388	377,690	1.3	5,021
Wire—Barbed and twisted	15	26	22,602	0.4	2	115,894	0.4	32
Wire—Woven wire fence	13	27	42,770	0.8	368	194,256	0.7	1,480
Wire—Bale ties	11	28	3,807	0.1	-	22,638	0.1	-
Black plate	10	29	30,054	0.6	86	268,530	1.0	254
Tin and terne plate—Hot dipped	10	30	131,060	2.5	-	720,078	2.5	10
Tin plate—Electrolytic	10	31	161,154	3.1	-	798,623	2.8	42
Sheets—Hot rolled	28	32	555,997	10.6	55,680	3,103,579	10.9	314,405
Sheets—Cold rolled	16	33	568,625	10.9	2,432	-2,979,826	10.5	10,604
Sheets—Galvanized	15	34	150,297	2.9	110	719,084	2.5	391
Sheets—Long terne	8	35	13,786	0.3	-	66,499	0.2	353
Sheets—Enameling	7	36	14,554	0.3	513	93,187	0.3	1,253
Sheets—Electrical	11	37	26,606	0.5	-	193,000	0.7	-
Strip—Hot rolled	22	38	141,784	2.7	23,416	766,676	2.7	134,822
Strip—Cold rolled	34	39	132,429	2.5	1,770	* 762,453	2.7	10,256
All other	4	40	1,287	-	-	6,039	-	-
Total steel products	138	41	5,234,862	100.0	456,488	*28,456,409	100.0	*2,708,887

During 1948 the companies included above represented 99.5 % of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

*Revised.

Plenty of Headaches In Steel Programs of European Nations

Present Method of Deciding On Programs Questioned By British Group

o o o

By F. H. HARLEY
British Correspondent

o o o

London

• • • **How much steel** should Europe produce? Where should the steel be made, and in what products? To what extent should existing facilities be modernized and replaced?

These questions are discussed in the latest bulletin of the British Iron and Steel Federation. The Federation concludes that failure of the Steel Committee of the Organization for European Economic Cooperation to agree on a modernization, expansion and development program for the steel industries of Western Europe could lead to (1) creation of excess capacity, (2) uneconomic use of investment resources and (3) consequent waste and future difficulties that this would entail.

The Federation points out that O.E.E.C. Steel Committee is finding it difficult to reject any particular project. This is because every action must be taken on a basis of mutual agreement. Unless some means is found to combine development plans on an European basis, the actions of the Committee will tend to become purely formal recognition of political pressure and bargaining made behind the scenes.

If such is the outcome, O.E.E.C. will fail in its objective. But, if the Committee can evolve a procedure whereby projects can be modified and adjusted, there is hope that it may achieve its objective of adjusting its investment program to provide an European steel industry balanced and adequate for the maintenance of an Europe independent of outside aid. It is suggested that projects be studied on a technical and industrial level before the plans are submitted to the Committee for final consideration.

The programs submitted by the participating countries call for production of 57.5 million tons of crude steel in 1952-53. Average prewar output was 44.5 million tons. There have been numerous views expressed as to the adequacy of expected output for the jobs to be done.

The Steel Committee was itself divided. But the majority felt that 57.5 million tons might prove to be too much. They felt that further studies should be made to try and evaluate the estimate in greater detail, with a view to modifying the 4-year development programs. And possibly extend them over a period of 7 years.

Smaller producers, who were unable to secure their normal imports during the war and postwar years, are anxious to become self-sufficient as far as possible. Large producers are tending to set up plant for all types of products—regardless of the efficiency of such developments, or of the cost, related to other producers.

The largest planned expansion of steelmaking capacity in Europe is in the United Kingdom and France. The French program includes extensive modernization. It also includes replacement of several blast furnaces and their equipment with larger and more modern plant. Also included are projects for modernization of steelmaking equipment and finishing processes.

Countries such as Belgium and Luxemburg don't propose any increase in "capacity." They are seeking to replace or modernize a considerable part of their production equipment.

The Italian program is primarily one of modernization. But it also includes increases in capacity at various works to bring production into better balance.

At present there is no German plan before the Committee. The German position is, of course, a special one.

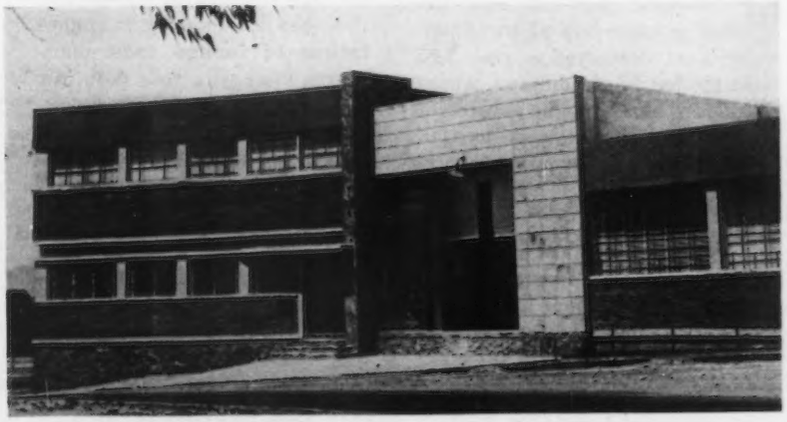
In Austria, plant removed by the Russians is to be replaced. And some finishing equipment is to be modernized. The major project is the installation of a semi-continuous strip mill to handle the bulk of sheet and plate production.

Sweden aims at sufficient expansion to make the country self-balancing in production and consumption. It is striving for an equal tonnage of imported and exported steel products.

Norway plans rehabilitation of iron ore mines. It has a large project for steel output based on production of pig iron with hydroelectric power. It hopes to develop a steel works in the north which will be able to supply the major part of the country's needs.

Throughout these programs there is an emphasis on flat products. This could greatly alter future world steel markets. The programs form the pieces of the puzzle which O.E.E.C. will attempt to fit together.

SOUTH OF THE BORDER: Industrial research for Mexican development has begun in the above newly constructed laboratory building in Mexico City which will be operated by the Armour Research Foundation of the Illinois Institute of Technology. The new lab was built by Banco de Mexico and will be used in the training of additional Mexican technologists.



Italy Gets $9 Million From ECA to Purchase Steel Mill Equipment

Washington

• • • **Five projects** to modernize the Italian iron and steel industry as part of that country's 4-year program were approved last week by the Economic Cooperation Administration.

These projects involve about $9 million in ECA assistance funds and almost 5 billion lire. The lire, to be spent in Italy, will be provided by the various companies. Most of the equipment for modernizing the plants will be purchased in the United States.

The principal objective of the Italian iron and steel program is to insure adequate supplies of iron and steel for the country's mechanical industries at international prices or less.

Studies indicate that a production level of 2.5 million ingot tons annually is a rational basis for current planning.

The projects approved were:

(1) Equipment for modernization of steel works of Acciaierie Ferriere Lombarde Falck at Milan—$2.2 million in ECA funds and 1.7 billion lire. Equipment to be purchased includes electric furnaces, tube forming and welding mill, forging and forming machines for nuts and bolts, strip welder for cold strip mill and auxiliary machinery with spare parts. Falck, the largest independent steel company in Italy, with a rated capacity in excess of 300,000 tons per year, operates three plants.

(2) Cold-rolling mill for tinplate for Cantieri Metallurgici Italiani at Castellammare di Stabia—$1,962,235 in ECA funds and 287.5 million lire. Equipment needed for this project includes reversing stand for cold rolling strip, straightening machine, pickling train, welding machine, strip washing plant, galvanizing machine and corrugating press. This company is a subsidiary of Falck.

(3) Slab and billet mill for special steel for Cogne S.P.A. in the Aosta Valley—$1,034,000 in ECA funds and 273 million lire. Modernization equipment immediately required includes a 10-ton oxygen plant, single-stand pig casting machine and slab and billet rolling mill. Cogne is a government-owned plant and operates on a high-grade ore mined near the plant.

50 YEARS AGO

THE IRON AGE, *July 13, 1899*

• "According to U. S. Consul Fowler the sudden rise in copper is responsible for extraordinary difficulties now confronting the Chinese currency. The result has been that the 'cash,' or subsidiary Chinese coin, is now worth much more than its face value in silver."

• **"The first half of 1899 shows a smaller number of railways placed in the hands of receivers than any 6 months since railway insolvencies began."**

• "Admiral Cervera and the other commanders of the Spanish fleet destroyed a year ago at the battle of Santiago, whose conduct has been the subject of inquiry by special court-martial, have been acquitted and formally liberated."

• **"It is said that the smelter interests in Colorado are not anxious to bring about the end of the strike until the constitutionality of the 8 hr law of the state is passed upon by the courts."**

• "A serious invasion of grasshoppers is reported from Nebraska and it is feared that the crops of the state will suffer in consequence. The species of grasshoppers now appearing is the same as that which devastated Kansas and Colorado 10 years ago."

• **"The London Engineer states that there have been statements in the daily papers to the effect that the Dum-dum bullet has been objected to at the Peace Conference."**

• "The scarcity of openhearth steel has led recently to importations of foreign basic openhearth steel wire rods both into this and into the Canadian markets. The rods are used chiefly for the manufacture of wood screws."

• **"*Stahl* und *Eisen* prints a reproduction of a photograph taken at the Friedrich-Wilhelm-Huette at Muelheim a.d. Ruhr of a blast furnace chimney which was struck by lightning, being perforated at 23 places."**

Gain Control of Company

Detroit

• • • **A group of** stockholders headed by S. F. Baker has acquired controlling interest of the Detroit Automotive Products Corp. from A. F. and F. D. Knoblock.

Products currently manufactured by the company at its plant on Grinnell Ave., Detroit, include the Thornton Drive, Load-Booster, and the NoSpin Differential. The firm is a large producer of automotive replacement traction equipment for trucks.

S. F. Baker becomes president and general maanger. Other officers include V. L. Anderson, vice-president and treasurer; Charles E. Lewis, secretary.

The company is expected to announce in the near future several new products which are presently in the development stage.

$5.9 Billion Authorized For Marshall Plan Aid

Washington

• • • **Through July 5,** procurement authorizations to Europe under the Marshall Plan amounted to $5.9 billion. Authorized aid to China amounted to $224 million; aid to Korea, $29 million.

Up to and through May 30, paid shipments under ECA had been reported in the amount of $3.8 billion, of which $1.5 billion represented industrial commodities.

Pressed Metals Team Touring Our Plants For New Techniques

New York

• • • **Great Britain's** fourth industrial team, this one from the pressed metals industry, arrived here last week to start a month's study of production methods in 15 American plants. The 10-man team is sponsored by the Anglo-American Council on Productivity in cooperation with ECA's Technical Assistance Div.

The team was told by P. D. Reed, co-chairman, U. S. Section, Anglo-American Council on Productivity, that the real payoff of their visit will be upon their return to England, by using their own ingenuity in modifying American techniques to their problems. Output can only be increased by getting more production out of the individual worker.

The team will be guests of the Pressed Metal Institute at its annual convention in Cleveland, July 20 to 22.

J. M. Phillips, English team leader, said that they had organized their line of approach so that the maximum benefit may be derived from the American tour. A report will be compiled of their observations during the plant visitations. This report will be issued and circulated to those in the British pressed metals industry. Discussion groups will also be held in different cities so that others can be given first hand information as to what makes American industry so productive.

ECA Buying Materials

Washington

• • • **Through the first** 15 months of Marshall Plan operation, purchases of nearly $54 million worth of critical materials have been arranged with participating nations, the Economic Cooperation Administration said recently.

These will go into the national stockpile and the procurements included such items as rubber, lead concentrate, graphite, cobalt, sperm and palm oil and platinum. Other contracts are under negotiation.

Of the total, $39.5 million represents outright purchases and the remainder is tied up in contracts for future deliveries.

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

690 Tons, Philadelphia, catapult for Philadelphia Navy Yard, to American Bridge Co., Pittsburgh.

500 Tons, Harrisburg, Pa., admissions building for Harrisburg State Hospital, to Bethlehem Steel Co., Bethlehem.

320 Tons, Wilmington, Del., service building for Delaware Power & Light Co., to Bethlehem Fabricators, Inc., Bethlehem.

310 Tons, Chicago, building for Burny Bros. Bakery to J. T. Ryerson & Son, Chicago.

300 Tons, Philadelphia, switchgear test station for General Electric Co., through United Engineers & Constructors, Philadelphia, to American Bridge Co., Pittsburgh.

280 Tons, Lamont, Ill., boiler house and heating plant for Argonne Laboratories to J. T. Ryerson & Son, Chicago.

200 Tons, New York, St. Mary's Church, 224th St., to Grand Iron Works, New York.

135 Tons, Attica, Ohio, Pennsylvania Railroad bridge 80.60, to Ingalls Iron Works, Verona, Pa.

135 Tons, Louise, Ariz., hatch covers U. S. B. of R. Specification 2691 to Mississippi Valley Structural Steel Co., Lebanon, Kan.

• • • Fabricated steel inquiries this week included the following:

3000 Tons, Pt. Pleasant, N. J., bridge over Manasquan River. N. J. Dept of Highways. American Bridge Co., Pittsburgh, low bidder.

1540 Tons, Tredyffrin Twp., Chester County, Pa.. Pa. Turnpike Commission, Section 28-B2, due July 22.

500 Tons, East Cocalico Twp., Lancaster County, Pa., Pa. Turnpike Commission, Section 25-C, due July 29.

280 Tons, Tredyffrin Twp., Chester County, Pa.. Pa. Turnpike Commission, Section 28-B-1, due July 22.

260 Tons, Brecknock Twp., Lancaster County, Pa., Pa. Turnpike Commission, Section 26-A, due July 29.

245 Tons, Selinsgrove, Snyder County, Pa., Pa. Dept. of Highways, beam bridge, LR 229(2-C) and LR 194(6-A), due July 22.

230 Tons, Cook County, Ill., state highway bridge Section 02031HF.

195 Tons, Cook County, Ill., state highway bridge Section 03031HF.

195 Tons, Island & Snohomish County, Wash., Stillaguamish and Davis Slough bridges, Director of Highways, Olympia, Wash., bids to July 22.

150 Tons, Wabash and Edward Counties, Ill., state highway bridge Section 17B, bids close July 15.

105 Tons, Yavapai County, Ariz., bridge on Rock Springs-Prescott highway, Arizona State Highway Commission, Phoenix, bids to July 15.

• • • Reinforcing bar awards this week included the following:

350 Tons, Philadelphia, school, 57th and Wynnfield Ave., to McCloskey & Co., Philadelphia, general contractor.

350 Tons, Wilmington, Del., John Wanamaker & Co. store, to John McShain, Inc., Philadelphia, general contractor.

260 Tons, Minneapolis, state highway bridge 5591, previously reported awarded to Paper Calmenson Co., St. Paul, bars to be furnished by U. S. Steel Supply Co., Chicago.

100 Tons, Vineland, N. J., sewage treatment plant, through Acchione Contracting Co., Philadelphia, to Bethlehem Steel Co., Bethlehem.

100 Tons, Jersey City, Palisade Ave., bridge, N. J. Dept. of Highways, to James Mitchell Co., New York, general contractor.

100 Tons, Philadelphia, catapult for Philadelphia Navy Yard, Hughes-Foulkrod & Co., general contractor, to Bethlehem Steel Co., Bethlehem.

• • • Reinforcing bar inquiries this week included the following:

360 Tons, Lancaster County, Pa., Pa. Turnpike Commission, Section 26-A, due July 29.

230 Tons, Lancaster County, Pa., Pa. Turnpike Commission, Section 25-C, due July 29.

225 Tons, Pt. Pleasant, N. J., Manasquan River bridge, N. J. Dept. of Highways, American Bridge Co., Pittsburgh, low bidder.

200 Tons, Salem, N. J., Salem County Memorial Hospital, Irwin & Leighton, Inc., Philadelphia, low bidder.

195 Tons, Waterloo, Iowa, hospital building.

150 Tons, Grant County, Wash., four bridges on S.S.H. No. 2-F, Odair to Electric City, Director of Highways, Olympia, Wash., bids to July 22.

145 Tons, Island & Snohomish County, Wash., Stillaguamish and Davis Slough bridges, Director of Highways, Oylmpia, Wash., bids to July 22.

145 Tons, Chicago, Central States Building and Realty Co.

125 Tons, Oakland, Calif., bridge on Marsh Road, County Clerk, Oakland, bids to July 19.

110 Tons, Okanogan County, Wash., Similkameen River bridge, Director of Highways, Olympia, Wash., bids to July 22.

Niedringhaus Dies; Was Granite City Steel Head

Granite City, Ill.

• • • Hayward Niedringhaus, 58, president of Granite City Steel Co., died suddenly at his summer home, Rockport, Mass., on July 7. The third generation of his family in the steel business, Mr. Niedringhaus had been president of Granite City since 1930. Under his administration the company plant was completely remodeled at a cost of $20 million.

He began his business career with the steel company as a laboratory assistant at the age of 19, and in 1911 became personnel director, followed by works manager, 1916; managing director, 1920; vice-president and general manager, 1924; and president and general manager, 1930. In addition to his position with the steel company, Mr. Niedringhaus was president of the Granite City Culvert Co., St. Louis & Eastern Belt Line, Tomahawk Land Co., West Calumet Mining Co., and Black Mountain Land Co.

He was a director of National Enameling Co., St. Louis Shipbuilding and Steel Co., and American Zinc Lead and Smelting Co.

A. P. Sloan Gives MIT $1 Million for Metals Processing Laboratory

Boston

• • • **Alfred P. Sloan Jr.** has given Massachusetts Institute of Technology a gift of $1 million for a metals processing laboratory, James R. Killian Jr., president of MIT announced to the alumni at a dinner in Hotel Statler recently. Mr. Sloan is chairman of General Motors.

Dr. Killian said that "the new metals processing laboratory, which is to be named for Mr. Sloan will enrich and extend the institute's entire engineering program. It represents a pioneer effort on the part of the institute to combine in an educational and research program the metallurgical and mechanical engineering approach to the fabrication of metals."

During the last 30 years, he said, Mr. Sloan has given more than $1 million in addition to his gift announced at the dinner. In 1929 he gave $65,000 to the aeronautical engineering laboratory. In 1937 he established the Alfred P. Sloan Fellowship Program in Business and Engineering Administration and supported it for 5 years, until interrupted by the war, with gifts totaling more than $100,000.

A year ago, by a grant of $225,000, the Alfred P. Sloan Foundation reestablished the fellowship program for 3 years. In 1946, Mr. Sloan contributed $225,000 to the institute to aid construction of the Gas Turbine Laboratory and enlarge and modernize the Sloan Automotive and Aircraft Engine Laboratory.

Prepares Unit Heater Code

Detroit

• • • **The engineering committee** of the Industrial Unit Heater Assn. is now carrying on a series of laboratory tests in the preparation of a uniform code for sound measurement of unit heaters. By cooperating with various organizations interested in developing standards for sound control and sound measurements, the committee will be able to offer a code whose methods are recognized by authoritative bodies. It is expected that the code will be issued by the end of 1949.

Red Lion to Market Carbide Tools for The Woodworking Industry

Red Lion, Pa.

• • • **Resulting from** experience with carbide tools in the manufacture of wood products, particularly radio cabinets, the Red Lion Cabinet Co., Red Lion, Pa., has actively entered the field of manufacturing and selling carbide tools to other woodworking companies. These activities will be handled through the Redco Tool Div., of the company.

The toolmaking activities will be concentrated in a new 30,000 sq ft plant. Tool developments thus far accredited to the company include a new line of helical tooth cutters with Carboloy tips that virtually eliminate tear-outs; a line of tipped router bits to sell in competition with steel router bits; a line of carbide tipped rip and crosscut rotary saws, as well as moulder bits and shaper heads; and a tool grinder and adapters for the grinder with which untrained personnel can grind any Redco carbide tool with only a few minutes instruction.

The last named development is the key to the entire Redco tool program. This is the only grinder adapted specifically to the needs of the woodworking industry. The grinder is reported to be reasonable in initial cost, do precision grinding even with inexperienced operators, and reduce grinding time for carbides to the same as that for ordinary tools.

The helical cutter bodies are aluminum pressure castings. The carbide blades are cast integrally with the aluminum head and shaped to conform to the helix of the cutter. All cutter bodies have the same ID and have a long taper. A long taper steel hub to take various self-centering split collets is assembled in the aluminum body, permitting the use of the same cutter head on practically any shaft or arbor. After finishing, the cutter assembly is dynamically balanced.

The company also plans to introduce a line of Carboloy tipped shaper knives and heads, tenon machine heads and form tools.

Austin Company Gives Labor Credit for Drop In Building Costs

Cleveland

• • • **An eight-point drop** from 174 to 166 in The Austin Co.'s quarterly index of industrial building costs (1926 = 100) was reported recently by George A. Bryant, president, who said that the largest single factor responsible for this reversal in a 10-year rising price trend has been improved labor productivity during the spring quarter.

The current 4.6 pct reduction in the cost index figure has been effected in the face of advancing labor rates and transportation costs and generally stable prices in most building material and equipment lines. The few isolated material price reductions announced thus far have been completely overshadowed by savings in the field, which account for more than 90 pct of the current drop in overall industrial building costs.

The index has always been figured on straight time rates, which for the past 10 years have been largely theoretical in many localities where you had to guarantee a certain amount of overtime in order to get any men on the job, Mr. Bryant explained. Today guaranteed overtime is out the window almost everywhere.

Need for Coal Engineers

Urbana, Ill.

• • • **There is** still plenty of room in the coal industry for graduate mining engineers, the University of Illinois believes. In contrast to this many other engineering fields are overcrowded. This is the basis for a plan to attract graduating high school students into coal mining engineering courses at the university.

During the 5 days of June 20 to 24, a short course in coal mining engineering was held for a group of 40 Illinois high school principals at the university. The course covered briefly what coal mining is and what the future holds for engineers in the industry. It explained progress made in mechanization and safety. And it attempted to dispell erroneous ideas which the public and prospective students might have.

Brazil Depends On Imported Coal For Industrial Expansion

Washington

• • • **In spite of ample coal** reserves, Brazil is still heavily dependent upon imported coal to meet its expanding industrialization and the rising costs of substitute fuels, according to the results of a cooperative survey of the coal industry in Brazil released recently by the Bureau of Mines.

Conducted at the request of the Brazilian government, the survey to investigate methods for increasing domestic coal production was started during the war by American coal specialists of the Board of Economic Warfare and the Foreign Economic Administration and completed by the Foreign Minerals Branch of the Bureau of Mines.

Brazil's principal producing coal fields are in the southern states of Rio Grande do Sul, Santa Catarina, Parana, and Sao Paulo, where the reserves are considered sufficient to last for more than 200 years at current production rates. Inadequate transportation facilities and the lack of modern mining equipment and methods reportedly are two of the major factors limiting the expansion of Brazil's coal production.

The use of modern mining equipment and methods to reduce production costs, preparation practice suited to the needs of consumers, better combustion methods, and more reasonable transportation rates, are suggested in the bureau's report.

Copies of Technical Paper 713, "The Coal Industry of Brazil, Part 1, General Economy, Production, and Marketing," may be obtained for 20¢ each from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Observers Report Plans For Light Car Models

Detroit

• • • **Persistent reports** of light car activity have focused attention on a car that would sell at considerably less than the present models, but many observers feel such Detroit-built cars are still a long way in the future.

The Big Three have given no indication of greatly intensified activity in this field, and GM has recently said quite frankly that it has no interest in a light car venture at the present time.

Recent reports have indicated that Nash and Hudson have plans well under way for a light car that would compete with Chevrolet, Ford and Plymouth. Kaiser-Frazer is known to have a smaller car than the present models but indicated activity on a new engine in cooperation with another car producer has never been confirmed.

As some observers see it, the best opportunity to introduce a light car occurred when used as well as new cars were desperately scarce and competition from used cars would have been minimized. Now used car competition is back and auto producers admit that they may have trouble trying to show their customers a cost savings comparable with the sacrifice in performance, appearance and riding qualities of the light car.

"A stripped model of the present size, possibly using a smaller engine, would be a better bet than a light car," an informed auto engineer told THE IRON AGE.

Aggressive Selling Pays

Detroit

• • • **Aggressive selling** is back in the auto service parts business. Pontiac, for example, has recently announced one of the most extensive parts merchandising programs in its history.

The winners are required to actively promote parts sales at wholesale. Inventory control will be strictly held and the program includes all the usual forms of dealer promotion.

Contestants in the competition include all full-time dealership parts managers. Suitable prizes will be awarded to winners of the district, zone and national competition.

Crosley Equipped With New Disc-Type Brake

Cincinnati

• • • **New brakes** of a disc-type originally developed for airplanes have been adopted as standard equipment on all Crosley cars, it was announced recently.

The new Crosley hydraulic brakes consist of a cast iron disc which rotates as part of the wheel. In place of the usual brake shoes, there are two friction "spots" which are fixed on opposite sides of the disc. These clamp against the disc under hydraulic pressure when the brake is applied.

The brake "spots" are faced with brake lining material and engage only a small part of the revolving disc surface at a time. With this set up, the rest of the surface remains comparatively cool, Crosley engineers explained.

In addition to its new Hydradisc brakes, Crosley is using an engine with a cast iron block. The new powerplant has a 7.8 to 1 compression ratio, and is equipped with valve rotators to improve valve life. Spiral bevel gears are used to drive an overhead camshaft.

Expects Permanent Steel Auto Top Here To Stay

Flint

• • • **The permanent** all-steel nonfolding top is here to stay in the opinion of many qualified automobile stylists.

Last week Buick put into production its swank Riviera which was introduced to the public at the Waldorf show last January.

Resembling a convertible in many respects, the body is lower than the conventional coupe. Passenger space and trunk capacity is considerably greater than for the convertible.

The familiar center posts have been completely removed and windows are push-button operated. The rear window comes well into the rear quarter panel.

All Riviera models have Buick's automatic Dynaflow transmission as standard equipment.

Other GM divisions have also announced "hard top" convertible models. A similar model, The Virginian, was introduced by Kaiser-Frazer several months ago.

Survey Shows Plants Close for Vacations

Cleveland

• • • **About 60 pct** of Cleveland's larger manufacturing plants will close from 1 to 2 weeks for employee mass vacations this summer, according to a survey recently completed by Cleveland Chamber of Commerce.

The survey, conducted by J. W. Vanden Bosch, chamber analyst, covered 358 manufacturing plants employing approximately 131,000 workers.

A total of 222 plants employing 85,750 workers will close for vacations. Of these plants, 161 plants, employing 74,900 will close for 2 weeks and 61 with 10,800 workers will close for 1 week.

The remaining plants surveyed, 136 employing over 45,000 will stagger vacations for their employees.

Because a larger and more diversified list of companies was surveyed in 1949, comparison with last year and with 1947 is difficult. The survey suggests, however, that more employees are coming under the 2-week closing schedule, even though the ratio between plants closing 1 week and those closing 2 weeks remains about the same.

ISIS Reception Committee

Washington

• • • **Harry Stave,** president of the Philadelphia chapter of the Institute of Scrap Iron & Steel, Inc., and George A. Rubine, president of the New Jersey chapter, have set up the officers and executive committee of their respective chapters as the reception committee for the midyear meeting of the Institute at Atlantic City, July 17-19.

The committee for the Philadelphia chapter, in addition to Mr. Stave, includes John F. Malloy, Dominic J. Giordano, Joseph D. Bardon, Abe Pollock, Joseph Bantivoglio, Thomas Marchisello, William L. Forebaugh, and Walter S. Gates.

The committee for the New Jersey chapter, in addition to Mr. Rubine, comprises Paul Giordano, Irving Bussel, Julius Brauer, Eli Bussel, Murray Kunin, Emanuel J. Moskowitz, Frank Contey, William Abramson, Abe Goldberg, William Isaac, and Henry Fiestal.

Alcoa Hydraulic Engineer Receives Honorary Degree

Pittsburgh

• • • **James P. Growdon,** chief hydraulic engineer for Aluminum Company of America was awarded the honorary degree of Doctor of Engineering by the University of Nebraska, his alma mater, at the school's commencement exercises in Lincoln, Neb., on June 6.

Mr. Growdon has won international recognition as an authority on hydraulic electric developments. In addition to designing and directing construction of most of the large hydroelectric dams built by Alcoa to furnish power for its aluminum plants, he has served as a consultant on big projects both inside and outside of the United States.

He pioneered the development of earth-faced rock-filled dams, and was the originator of the method of placing concrete in construction jobs with the use of vibrators—a method now almost universally employed.

End for Iron Hull Ship

Seattle

• • • **As it must to** all men—and to ships—the end is at hand for the historic wrought iron hull of the old Diamond Head, one of the world's first iron ships which is heading for the scrap yard.

The day the ship was launched in 1866 thousands of Londoners turned out to watch her sink—just because everyone knew an iron ship couldn't float. But the Lady Gainsborough—that was her name then—slid down the ways to become a monument in shipbuilding annals. To be sure, ironclad ships with wooden hulls had been built before, but this one was something new. For 30 years it sailed from the British Isles to India, China and the Hawaiian Islands.

On one trip to Hawaii it ran aground and was given up by its owners, but the islanders refloated it and named it the Diamond Head. Eventually iron ships with engines shoved her into the background and she came to Seattle's Lake Union to become an oil barge for the City Light plant. Two years ago it was moved to Harbor Island to "work" for the General Petroleum Co. as a tank. But with the construction of new tanks she is no longer needed.

"We have no fear of any sudden breaks with Monel Pickling Chain on the job!"

You'll always find pickling-room foremen confident of safety with Monel* chain.

Take the chain shown above. It's ¾" Monel, and has been in pickling service over 6 years. In the same plant is another chain, a 1¼" cast acid-resisting chain. Yet, for the heaviest loads, they use the lighter Monel chain because "*. . . we find it reliable and not subject to sudden breaks, as is the case with the cast acid-resisting chain.*"

For over 40 years, Monel has paid its way in pickling service, because Monel resists corrosion by hot pickling acids and fumes. It's stronger and tougher than structural steel. And, Monel welds retain full strength, full corrosion resistance.

So, whether you use chain as slings or in mechanical picklers . . . for longer life and greater safety that chain should be *Monel!*

*Reg. U. S. Pat. Off.

"PICK" MONEL *for all types of pickling equipment. In addition to chain, you can have crates, baskets, tie-rods, hairpin hooks and other pieces fabricated to your design out of economical standard mill forms. For more information on Monel and Monel fabricators, write to our Ray Reddell.*

DESIGNERS and MANUFACTURERS! Sand castings and precision castings of Monel, Nickel, Inconel* and other Nickel alloys are available from INCO's own foundry.

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THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall St., New York 5, N. Y.

"MONEL*" Pickling Equipment means *Extra CAPACITY . . . Extra LIFE . . . Extra SAFETY*

European Letter

(CONTINUED FROM PAGE 131)

western European communities—the rapid rise in Italian population. The Italians are expanding at a rate of 400,000 a year and the peninsula has not the means to absorb such an increase. The classic methods of raising productivity—by increased mechanization and the reduction of direct labor costs—can be used only very circumspectly in an economy overflowing with available manpower who must either be absorbed or go unemployed or find means of emigration.

The problems facing the Italian government are thus formidable. The prosperity achieved so far is precarious since it has been underpinned by a favorable but probably temporary conjunction of circumstances in the export trade and by Marshall aid. Unfortunately for the Italian government, the fundamental difficulty — insufficient resources to support too many people—is beyond their control and only a great act of western solidarity in which the United States, the British Commonwealth, Latin America and France agreed to back a program of regular Italian emigration would put a really sound foundation under the rickety Italian house.

NEVERTHELESS, more could undoubtedly be done to increase the size of the internal market in Italy and to improve productivity in both industry and agriculture. The rate of capital accumulation has been insufficient to exploit all the resources of the Italian community. In spite of a great increase in savings — the Minister of the Treasury, Signor Pella, recently put the percentage of savings at 18 pct of the national income—they do not find their way in sufficient scale into industry or agriculture. The reason is in part the extent of state control. Over 70 pct of the saving institutions are controlled by government and through direct ownership or through the mammoth holding company, the IRI *(Istituto di Ricostruzione Industriale)*, large sectors of all heavy and mechanical industry are state controlled. But ever since the crisis caused by inflation in 1947, all state institutions have fought shy of credit expansion for fear of disturbing Italy's hardly gained monetary stability. The result has been a caution which has aroused Italy's American advisers to protest. A modest reversal of the trend has now been introduced and the long term estimates for Italian investment have been increased, but this expansion is still inadequate.

Private industry has not taken up the slack left by government. Italian industry, feudal in tradition, largely monopolistic in its higher reaches, protected by decades of fascism and long financed by a series of disastrous war efforts, has missed the revolution essential to genuine free enterprise —the revolution of Henry Ford. Save in a few exceptions, the notion of producing cheaply for the many and gaining small profits in a large turnover is not part of the Italian business mentality. Investment remains weak, and the increases forecast in Italy's long term plan for investment by private business are unlikely to be achieved.

THIS relative stagnation in Italian big business underlines another weakness in Italian society—the gulf between the small group of industrialists and landed proprietors of great wealth and the poverty of the masses. The visitor sometimes has the impression of living in a country with almost totally disconnected economies — the small, closed circle of the very wealthy and the poor, ingenious, resourceful, intensely active life of the masses. This antiquated social structure has its economic repercussions in limited high cost production and the lack of a large internal market. It has its political repercussions in the alienation of a large part of the workingclass and the perpetual undercurrent of political instability. The recent strikes among the farm workers were thus symptoms of a much wider malaise.

New Technique for Bridge

Tacoma, Wash.

• • • **What is believed** to be a new technique has been used on the Tacoma Narrows Bridge in leveling the concrete pillars rising from the piers and which provide the footings for the steel towers.

On other suspension bridges many weeks have been spent grinding the tops of these pillars, or pedestals, down to true level before the towers were erected on them.

This precision is necessary, for the pedestal must be as near perfect as a man can make it since the difference of 1/16 in. at the bottom can throw one of the 507-ft towers several inches out of line at the top.

The new technique eliminates all of this polishing and grinding. While the pedestal is being poured, a steel grill is being machined to within eight thousandths of an inch of true. This grill is set into the top of the pedestal as a footing for the tower.

As the concrete is poured, adjusting screws are placed in it. When the pedestal is within a foot of its true level, the grill is set on the adjusting screws. The last foot of the pedestal is then grouted under, around and on top of the grill to a thickness of 1/16 in. The grout is allowed to set for 6 hours after which it is shaved down to the grill. No grinding of the pedestal top is required.

Emphasizes Our Prosperity

Boston

• • • **L. R. Boulware,** vice-president of General Electric Co. told the 19th annual Business Conference at Harvard University recently that Americans can't be too badly off if. "we treated ourselves to 1 million new homes last year, 4.5 million refrigerators, and almost 5 million motor vehicles." He accused organized minorities of trying to influence legislation. "I sincerely believe that a majority of the present Senate and Congress would like to keep the Taft-Hartley Law pretty much as it is," he said.

William B. Given Jr., president of American Brake Shoe Co. said "there is no shortage of young men who can be developed into executives in most large companies."

MACHINE TOOLS

. . . News and Market Activities

No Activity Expected in Tool Industry During Vacation Period

• • • **A long** and quiet summer was shaping up for the machine tool industry this week as the plant vacation period, an annual development that is rapidly gaining quasi-official status as a seasonal factor in the machine tool market, got under way in major industrial areas.

According to authoritative sources in the trade, no new big programs involving machine tools are on the docket at present, except the air forces procurement program, which is not expected to prove of any direct help to the machine tool industry. Under the program, subcontractors may require some equipment, but the outlook is far from optimistic.

ECA is presently at a standstill, awaiting appropriations. Thus, allocations for the new fiscal year cannot be made, a fact which leaves the machine tool industry unhappily dangling.

On the other hand, the volume of inquiries received by major segments of the industry leads some sources to believe that a pickup in the machine tool business is definitely on the way for fall, an opinion that is by no means general.

At present, plants are spending money for machine tools only if they can see an immediate return on the investment. Such buyers want, and are generally getting, quick delivery.

Some machine tool buyers are holding off for price reductions, which major segments of the machine tool industry are not likely to make, believing that price cuts do not make for continuing business in a declining market.

At the same time, if the steel industry's labor problems can be settled without a wage increase or other benefits that take dollars out of company tills, consumers will expect, and probably get, a steel price cut. This, some machine tool buyers believe, will start prices rolling downward all along the line, a trend difficult for any industry, including the machine tool industry, to resist.

Volume of Inquiries Remains Up But No New Commitments Involving Large Orders

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But what the machine tool industry really needs, and right now, about as badly as any time in its prince and pauper history, is a liberalized tax depreciation law on capital equipment, which would permit manufacturers to write off machine tools in terms of their actual mechanical obsolescence.

Periods such as the present suggest that the government might well consider an action of this sort, because the machine tool industry is getting smaller. The trend is to fewer and larger companies, making the industry less flexible, in time of peace or in time of war.

In Detroit, a few of the clouds of obscurity have been brushed away in the past few weeks and the outlook for the machine tool industry is actually somewhat brighter, according to trade sources. While no major tooling programs have been started, promising inquiries continue to come in and some important developments are anticipated in the not too distant future.

The tooling for Detroit Gear's new transmission is progressing as expected although a substantial portion of this will not be new equipment, informed sources believe. The recent announcement by Ford that a 100-acre site has been purchased in Buffalo for a press shop has encouraged suppliers of presses and other equiment who have been hopeful for some time that a major decision on this project would soon be made by Ford management. Meanwhile, reports persist here that Ford has some important diecasting developments under consideration, although no placements on such a program have been reported up to the present time.

The Dodge engine program, which has been rather quiet in recent months, was reactivated this week, indicating that it would be possible to place orders on this equipment before the end of the year.

An always encouraging sign in Detroit is the presence of large numbers of blueprints in the tool and die shops, which invariably results in new ordering before too many months have passed. There has also been, surprisingly enough, some recent interest here in screw machines, it is reported.

Power Shovel Concern Will Celebrate No. 50

Lorain, Ohio

• • • **On July 17,** Thew Shovel Co. will celebrate its 50th anniversary as a corporation.

Thew's actual history began 4 years earlier, in 1895, when Capt. Richard P. Thew designed and built the first full revolving shovel.

Developed during the industrial expansion of the early 1900's, Thew full revolving steam shovels soon found their way into mines, brick plants, highway jobs, building excavations and related jobs.

During World War I, the AEF asked for 5-ton cranes mounted on motor trucks for work on the French docks. No such units were then built, and the idea was new. It led to the development by Thew's president of the original truck crane, first produced and marketed by Universal Crane Co., which became a Thew subsidiary in 1923 and was merged completely with Thew in 1937.

Today Thew operates five plants, two in Lorain, two in Elyria and one in Bucyrus, Ohio, and employs over 1500 men and women, with all its engineering and production facilities concentrated solely on the manufacture of power shovels and cranes.

NONFERROUS METALS

. . . News and Market Activities

Copper and Lead Prices Raised as Metals Markets Show Strength

New York

• • • **Last week** saw the first upward price movements in the primary metal markets when copper was advanced 1¢ on July 6 and ⅝¢ on July 11 by custom smelters. Lead was raised 1¢ on July 8. This action brings the price of copper to 17.625¢ Valley, and the price of lead to 13¢ New York.

Now that the long period of inventory reductions seems to be coming to an end and buying is being done in increasing volume, it would appear that the markets might be headed for higher price levels in the immediate future. With the resumption of buying on any significant scale it will soon become apparent that the tonnage of copper available from custom smelters will not be sufficient to meet normal demand. Producers have maintained their prices well above the custom smelting level in the knowledge that after a period of time at a bottom price level the market would be forced upward by renewed demand. In the meantime, producers haven't been selling heavy tonnages of copper.

The lead market showed the earliest evidence of strength in the secondary market when scrap began to tighten up and the smelting charge had to be reduced week by week. This was followed by an influx of orders for heavier tonnages.

Buyers usually order heavily in a rising market, so the initial advances can be expected to be followed by others, perhaps within a very short time. This is particularly true after a long period of inventory reductions. Observers of the market are generally of the opinion that prices will reach stabilization points well below recent peak levels.

The improved position of the copper and lead markets had not reacted pricewise on the zinc market by the end of the week. But producers reported that orders were coming in for heavier tonnages and much more freely.

Inventory Corrections Now Completed by Some Firms Entering the Market

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The rise in the copper market was preceeded by tightness in the scrap market and advances of ½¢ to 1¾¢ per lb in the buying prices of some ingot makers. Immediately after the advance, refineries raised their copper scrap buying prices by 1¾¢ per lb, bringing No. 1 to 14.25¢.

Revere Copper & Brass Co. took the lead in advancing mill products prices to the 17¢ copper level on July 7, at the same time instituting a firm price policy for orders which could be produced and delivered within 60 days. No other mill followed this action by weekend, some having notified their customers that there would be no advance in their prices for the present.

Some observers believe the mills may be holding back pending further advances in the prices of copper and zinc. There is no doubt that Revere will be forced to return its price schedule to the competitive level if no action is taken by other mills. The 60-day firm price policy replaces one of price at time of shipment designed to protect customers against a declining metal market.

Brass and bronze ingot producers advanced the price of ingots by ½¢ to 1¢ per lb last week.

In recent weeks one aluminum producer has been revising prices of certain mill products. Price reductions have been made in some tubular products.

Wage negotiations between the Aluminum Co. of America and the USW-CIO are at a standstill pending developments in the United States Steel Corp, negotiations. The union is reported to have requested a reopening of the contract for a wage increase, pensions and other fringe benefits on May 31. Proposals were not presented at that time, however, and the meeting was adjourned on the basis of a 30-day notice by either party of intention to terminate the contract. The termination notice was presented by the union on June 30. There have been no further negotiations.

The strike at the Carteret, N. J. refinery of U. S. Metals Refining Co. is causing the loss of about 11,000 tons of copper production a month. L. E. Cole, manager, reported that a meeting was held last week between union and management at the call of Commissioner Schuld of the Federal Mediation Service. At the meeting the company management maintained the necessity for continuing the engineering study in the plant, while the union held to its former position of objecting to the study as well as to the application of incentive plans.

There are to be no further meetings for 3 weeks. The strike which began on July 1 was called by the CIO-Mine, Mill & Smelter Workers Union. The union is also demanding a wage increase of 25¢ an hour, pension, insurance and other benefits.

Nonferrous Metals Prices

	July 6	July 7	July 8	July 9	July 11	July 12
Copper, electro, Conn.	17.00	17.00	17.00	17.00	17.625	17.625
Copper, Lake, Conn.	18.625	18.625	18.625	18.625	18.625	18.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	9.00	9.00	9.00	9.00	9.00	9.00
Lead, St. Louis	11.85	11.85	12.85	12.85	12.85	12.85

Note: Quotations are going prices.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	17.625
Copper, lake, Conn. Valley	18.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	12.85
Lead, New York	13.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, cariots	34.50
Mercury, dollars per 76-lb flask f.o.b. New York	$82 to $84
Nickel, electro, f.o.b. New York	42.93
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$69 to $72
Silver, New York, cents per oz.	71.50
Tin, Grade A, New York	$1.03
Zinc, East St. Louis	9.00
Zinc, New York	9.70
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	13.75*	16.00
No. 120	13.25*	15.50
No. 123	12.75*	15.00
80-10-10 ingot		
No. 305	....	20.50
No. 315	....	17.50
88-10-2 ingot		
No. 210	....	27.00
No. 215	....	24.00
No. 245	16.50*	19.25
Yellow ingot		
No. 405	11.50*	13.75
Manganese bronze		
No. 421	....	18.50

*F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	18.00-18.50
0.60 copper, max.	17.75-18.25
Piston alloys (No. 122 type)	15.50-15.75
No. 12 alum. (No. 2 grade)	14.50
108 alloy	15.25-15.50
195 alloy	16.00-16.75
13 alloy	18.50
AXS-679	15.50-16.00
5% Ti, Aluminum, f.o.b., Eddystone, Pa.	
Low copper	31.00
2% copper	28.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	15.50-15.75
Grade 2—92-95%	14.50-14.75
Grade 3—90-92%	13.50-13.75
Grade 4—85-90%	12.50-12.75

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	34⅝
Electrodeposited	28⅞
Rolled, oval, straight, delivered	31.84
Ball anodes	32⅞
Brass, 80-20	
Cast, oval, 15 in. or longer	30⅜
Zinc, oval, 99.886, f.o.b. Detroit	22½
Ball anodes	20½
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	48.00
Copper sulfate, 99.5 crystals, bbl.	9.10
Nickel salts, single or double, 4-100 lb bags, frt. allowed	18.00
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	6.75
Zinc sulfate, 25 pct, flakes, bbl.	7.75

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25, 36.7¢ to $1.05; 35 to 37, 44¢ to $1.53; 47 to 49, 63.5¢ to $2.20.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅝ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 19/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ⅓ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.965 to 0.082, ⅝ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	30.68	....	30.28
Copper, hot-rolled	....	26.53	....
Copper, drawn	....	27.78	....
Low brass	28.77	28.46	31.68*
Yellow brass	27.44	27.13	30.45*
Red brass	29.21	28.90	32.12*
Naval brass	32.37	26.43	27.68
Leaded brass	....	21.96	26.03
Commercial bronze	30.18	29.87	32.84*
Manganese bronze	35.87	29.78	31.28
Phosphor bronze, 5 pct	49.87	50.12	....
Muntz metal	30.38	25.94	27.19
Everdur, Herculoy, Olympic, etc.	35.59	34.54	....
Nickel silver, 10 pct	38.48	40.74	40.76
Architectural bronze	....	....	26.03

*Seamless tubing

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	14	13¼
Yellow brass	11⅛	10¾
Red brass	12⅜	11⅞
Commercial bronze	11⅞	11⅛
Manganese bronze	10⅞	10
Leaded brass rod ends	10⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	14.25
No. 2 copper wire	13.25
Light copper	12.25
Refinery brass	10.50 to 11.00*
Radiators	8.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	14.25
No. 2 copper wire	13.25
Light copper	12.25
No. 1 composition	10.50
No. 1 comp. turnings	10.00
Rolled brass	8.00 to 8.25
Brass pipe	9.00
Radiators	8.50
Heavy yellow brass	7.50
Aluminum	
Mixed old cast	7.50
Mixed old clips	7.50
Mixed turnings, dry	6.00
Pots and pans	7.50
Low copper	11.00

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	12¼—12¾
No. 2 heavy copper and wire	11¼—11⅝
Light copper	10¼—10⅝
Auto radiators (unsweated)	7⅛— 7½
No. 1 composition	8⅝— 9⅛
No. 1 composition turnings	8⅛— 8⅝
Clean red car boxes	7¼— 7½
Cocks and faucets	7¼— 7½
Mixed heavy yellow brass	6 — 6¼
Old rolled brass	7 — 7¼
Brass pipe	7½— 7¾
New soft brass clippings	10 —10½
Brass rod ends	6½— 7
No. 1 brass rod turnings	5½— 6
Aluminum	
Alum. pistons and struts	3¼— 3½
Aluminum crankcases	5 — 5½
2S aluminum clippings	9 — 9½
Old sheet and utensils	5 — 5½
Borings and turnings	3
Misc. cast aluminum	5 — 5½
Dural clips (24S)	5 — 5½
Zinc	
New zinc clippings	4½— 5
Old zinc	3 — 3½
Zinc routings	2 — 2½
Old die cast scrap	2
Nickel and Monel	
Pure nickel clippings	16 —17
Clean nickel turnings	14 —15
Nickel anodes	16 —17
Nickel rod ends	16 —17
New Monel clippings	10½—11½
Clean Monel turnings	6 — 7
Old sheet Monel	8 — 9
Old Monel castings	7 — 8
Inconel clippings	10 —11
Nickel silver clippings, mixed	6 — 7
Nickel silver turnings, mixed	5½— 6
Lead	
Soft scrap, lead	9 — 9½
Battery plates (dry)	5¾— 6
Magnesium Alloys	
Segregated solids	9 —10
Castings	5½— 6½
Miscellaneous	
Block tin	70 —72
No. 1 pewter	47 —49
No. 1 auto babbitt	40 —42
Mixed common babbitt	11 —11½
Solder joints	10½—11
Siphon tops	45 —47
Small foundry type	12¼—12¾
Monotype	11½—12
Lino. and stereotype	11 —11½
Electrotype	9½—10
New type shell cuttings	10¼—10¾
Hand picked type shells	4
Lino. and stereo. dross	5 — 5½
Electro. dross	3½— 4

SCRAP

. . . News and Market Activities

Prices Fairly Steady In Dull Market

New York

• • • There was no significant change in the market this week which would indicate a halt in the downward trend. Lack of activity on the part of major consumers is still responsible for the present status of the market. Foundries are still out of the market and are not accumulating any material during their vacation periods. Mills have not shown any interest during the past week, in fact many are not permitting any scrap shipments—at least until the strike picture becomes clearer.

This is the second consecutive week that THE IRON AGE scrap composite remains unchanged at $19.33 per gross ton which is also the low for the year. Prices of No. 1 heavy melting steel this week are: Pittsburgh, $20.50 to $21.00; Chicago, $19.50 to $20.00; and Philadelphia, $17.00 to $18.00.

Price changes were negligible during the past week. There are some indications that the market may be near the bottom. Some dealers are stockpiling because they believe present prices cannot go much lower. Other dealers have refused to ship scrap at brokers' prices—of course all dealers are not in sound financial condition and some are compelled to sell at going market prices. With some scrap items being in limited supply in certain areas, any consumer buying would tend to raise prices in a hurry.

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PITTSBURGH — Some railroad No. 1 steel went to brokers at $21.00 a ton, some at $21.50, which means that the current $22.00 top quotation on this grade may not last long and when it comes down, No. 1 steel will come with it. Other railroad items were off by from 75¢ to $2.00. New business is still practically nonexistent. The matter of stockpiling scrap if there should be a steel strike—as was done in 1946—has not yet been considered. Turnings were off by 50¢ a ton.

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CHICAGO—For the first time this year the market has developed a strong undertone here. Mill prices remain unchanged and a few distressed cars have moved at lower prices but buying by dealers and brokers has increased. In view of the strike possibilities this turn of sentiment is surprising to some. The brokers and dealers have always maintained that when scrap prices got low enough it would be bought for inventory regardless of mill activity. It appears, therefore, that the trade here believes present prices are bargains and they are stocking up. Last week sales of unprepared by large concerns in the area at higher figures plus more activity in bidding on railroad lists substantiates this trend. Cast scrap continued to hold the advances made in recent weeks. Cast scrap is so scarce that any normal demand would further strengthen this market in a hurry.

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PHILADELPHIA—With mills and foundries still out of the market last week, the scrap market was completely inactive. The only activity was in turnings, which will move to dockside here late this week, to be followed by further loading at New York. It is understood that there is a scrap export allocation of less than 50,000 tons for the third quarter. There have been a number of inquiries for scrap for export received in this market, but the turnings shipment will be the first to leave here. While the scrap export movement begins, imports continue to arrive on old commitments. Several mills in the district are closed down for vacation periods. Quoted scrap prices were unchanged last week.

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CLEVELAND—Between the plant vacation period, which is now in full swing, and the threat of a steel strike, the scrap market here was despondent this week. If the strike materializes, indications are that there will be much distress scrap in this area which will probably move to dealers' yards on a speculative basis. As a result of the plant vacation period, very little scrap is being generated, although mills are stockpiling material in some districts, on the theory that scrap is cheaper today than it will be when somebody needs it.

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CINCINNATI—Prices are nominal here and interest in all grades is practically nonexistent. Mills are buying nothing, and have taken no dealer scrap for the past month. Some plant scrap is moving on old orders, and one mill released a few cars late last week, but otherwise the movement of scrap is at a very low ebb. Foundries are buying incidental tonnages and keeping inventory at an operational minimum.

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DETROIT—Fear of a steel strike has added a note of uncertainty to an already hesitant scrap market. Holdups have already gone out and no shipments are being permitted by major scrap buyers until the strike picture is cleared. Meanwhile, the market remains weak although limited segments, cast grades in particular, are showing some slight indications of strength. Two questions have been raised here among the trade that may soon require a definite answer: (1) Does the permanent pattern for the future call for more direct scrap buying by mills from big auto plants? (2) Is this really the bottom of the scrap price decent that has persisted now for months?

NEW YORK—Scrap movement in this area was practically at a standstill last week. Foundries were out of the market due to their vacation periods. Mills are not doing any buying and probably will remain out of the market until the strike picture is clarified. Dealers report that scrap is still moving into their yards from industrial plants. At present, brokers have no orders out for shipment of this material. All scrap prices remain unchanged from the previous week.

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ST. LOUIS—Because of summer vacations taking buyers away and caution born of the possibility of a steel strike, the scrap iron market continues dull, with prices unchanged. Receipts in the market are light.

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BOSTON—Activity is still at a low ebb and there is no change in price. Many of the dealers have taken vacations and a number of yards are closed up. Cast is still not moving.

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BIRMINGHAM—One of the small mills in the southern district has purchased tonnages of No. 2 heavy melting steel at $16.00 which is $2.00 below the previous price paid for that material in this area. Larger consumers of openhearth grades still are out of the market. No. 1 cupola cast continues to show strength with as much as $28.00, a $2.00 advance, being offered. Available supplies of No. 1 cupola cast, however, are very scarce here.

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BUFFALO—Scrap was extremely quiet with prices unchanged this week as the trade awaited developments in the steel labor negotiations. At the same time, market sentiment among dealers and brokers was improved. Belief was expressed by some leaders that the bottom of the decline had been reached, except for possible minor readjustments, and no further reductions were anticipated. Two boatloads of steelmaking scrap were scheduled to arrive this week for a leading consumer from Duluth and canal movement from New York is scheduled to be heavy for the next several weeks.

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TORONTO—Steel mills in the Hamilton district have cut steel scrap prices $2.00 per gross ton below the ceiling which continues in effect. The steel mills have not only reduced scrap prices but have put the dealers trade on a severely restricted quota regarding the quality of scrap that may be shipped. Price control in Canada still exists, but so far as scrap is concerned ceilings are merely fictional. At the same time Canadian scrap producers have no alternative outlets as export is still prohibited, despite the fact that the action taken by the mills to reduce prices would indicate that steel scrap no longer is in short supply. It is stated that slashing of scrap prices in the United States has enabled Canadian consumers to obtain larger quantities and at prices below the former Canadian ceiling from across the line. Cast scrap also is reported in ample supply and the price has been cut to $25.00 to $27.00 per gross ton.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.50 to $21.00
R.R. hvy. melting	21.00 to 22.00
No. 2 hvy. melting	18.50 to 19.00
No. 2 bundles	16.50 to 17.00
R.R. scrap rails	21.50 to 22.00
Rails 2 ft and under	25.00 to 25.50
No. 1 comp'd bundles	20.50 to 21.00
Hand bdld. new shts.	18.50 to 19.00
Hvy. steel forge turn.	17.50 to 18.00
Mach. shop turn.	13.00 to 13.50
Shoveling turn.	16.00 to 16.50
Mixed bor. and ms. turn.	13.00 to 13.50
Cast iron borings	16.00 to 16.50
No. 1 mach. cast	26.00 to 27.00
Mixed yard cast.	21.50 to 22.50
Hvy. breakable cast.	18.50 to 19.00
Malleable	21.50 to 22.00
RR. knuck. and coup.	23.00 to 23.75
RR. coil springs	23.00 to 23.75
RR. leaf springs	23.00 to 23.75
Rolled steel wheels	23.00 to 23.75
Low phos.	21.50 to 22.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50 to $20.00
No. 2 hvy. melting	17.50 to 18.00
Factory bundles	19.50 to 20.00
No. 1 dealers' bundles	16.00 to 17.00
No. 2 dealers' bundles	15.00 to 16.00
Mach. shop turn.	11.00 to 12.00
Short shov. turn.	13.00 to 14.00
Cast iron borings	12.00 to 13.00
Mix. borings and turn.	9.00 to 10.00
Low phos. hvy. forge	23.00 to 24.00
Low phos. plates	21.00 to 22.00
No. 1 RR. hvy. melt.	21.50 to 23.25
Rerolling rails	27.50 to 28.25
Miscellaneous rails	23.50 to 24.00
Angles and splice bars	24.50 to 25.50
Locomotive tires, cut	26.50 to 27.50
Cut bolster & side frames	24.00 to 25.00
Standard stl. car axles	27.25 to 29.00
No. 3 steel wheels	23.25 to 23.75
Couplers and knuckles	23.00 to 23.50
Rails, 2 ft and under	27.00 to 28.00
Malleable	24.00 to 25.00
No. 1 mach. cast	30.00 to 32.00
No. 1 agricul. cast.	29.00 to 30.00
Heavy breakable cast.	23.50 to 24.00
RR. grate bars	16.00 to 17.00
Cast iron brake shoes	18.00 to 20.00
Cast iron car wheels	28.00 to 29.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$16.50 to $17.00
No. 2 hvy. melting	15.00 to 15.50
No. 1 bundles	16.50 to 17.00
No. 2 bundles	13.00 to 14.00
Mach. shop turn.	7.00 to 8.00
Shoveling turn.	7.00 to 8.00
Cast iron borings	8.00 to 9.00
Mixed bor. and turn.	7.00 to 8.00
Low phos. 18 in. under	24.00 to 25.00
No. 1 cupola cast.	25.00 to 26.00
Hvy. breakable cast.	17.00 to 18.00
Rails 18 in. and under	27.00 to 28.00
Rails random length	19.00 to 20.00
Drop broken	27.00 to 28.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$10.00 to $11.00
No. 2 hvy. melting	8.00 to 8.50
No. 1 bundles	10.00 to 10.75
No. 2 bundles	8.00 to 9.00
Bushelings	7.50 to 8.00
Shoveling turn.	7.00 to 7.50
Machine shop turn.	3.00 to 3.50
Mixed bor. and turn.	2.50 to 3.00
Cl'n cast chem. bor.	9.00 to 10.00
No. 1 machinery cast.	26.00 to 29.00
No. 2 machinery cast.	18.00 to 21.50
Heavy breakable cast.	16.00 to 17.00
Stove plate	16.00 to 17.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$12.50 to $13.00
No. 2 hvy. melting	10.50 to 11.00
No. 1 bundles	12.50 to 13.00
New busheling	12.50 to 13.00
Flashings	12.50 to 13.00
Mach. shop turn.	7.00 to 7.50
Shoveling turn.	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Mixed bor. and turn	7.00 to 7.50
Low phos. plate	12.50 to 13.00
Heavy breakable cast.	15.00 to 18.00
Stove plate	16.00 to 17.00
Automotive cast.	22.00 to 24.00
No. 1 cupola cast.	22.00 to 23.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00 to $18.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 bundles	17.00 to 18.00
No. 2 bundles	15.00 to 16.00
Mach. shop turn.	10.50 to 11.50
Shoveling turn.	12.50 to 13.50
Mixed bor. and turn.	10.00 to 10.50
Clean cast chemical bor.	16.00 to 17.00
No. 1 machinery cast.	27.00 to 28.00
No. 1 mixed yard cast.	24.00 to 25.00
Hvy. breakable cast	23.00 to 24.00
Hvy. axle forge turn.	17.00 to 18.00
Low phos. punchings, plate	20.00 to 21.00
Low phos. 5 ft and under	19.00 to 20.00
Low phos. bundles	17.00 to 18.00
RR. steel wheels	22.00 to 22.50
RR.coil springs	22.00 to 22.50
RR. malleable	23.00 to 24.00
Cast iron carwheels	27.00 to 28.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	17.00 to 18.00
No. 2 bundled sheets	15.00 to 16.00
Mach. shop turn.	10.00 to 11.00
Shoveling turnings	10.00 to 11.00
Locomotive tires, uncut	18.00 to 19.00
Mis. std. sec. rails	21.00 to 22.00
Steel angle bars	23.00 to 24.00
Rails 3 ft and under	25.00 to 26.00
RR. steel springs	21.00 to 22.00
Steel car axles	25.00 to 26.00
Brake shoes	19.00 to 20.00
Malleable	19.00 to 20.00
Cast iron car wheels	24.00 to 25.00
No. 1 machinery cast.	23.00 to 25.00
Hvy. breakable cast.	19.00 to 20.00
Stove plate	20.00 to 21.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.00
No. 2 hvy. melting	16.00
No. 2 bundles	14.00
No. 1 busheling	16.00
Long turnings	13.00
Shoveling turnings	15.00
Cast iron borings	15.00
Bar crops and plate	22.50
Structural and plate	22.50
No. 1 cupola cast.	$27.00 to 28.00
Stove plate	20.00
No. 1 RR. hvy. melt.	20.00 to 20.50
Steel axles	20.00
Scrap rails	20.00
Rerolling rails	22.50 to 23.00
Angles & splice bars	22.00 to 23.00
Rails 2 ft & under	23.00 to 24.00
Cast iron carwheels	17.00 to 18.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50 to $20.00
No. 2 hvy. melting	17.00 to 17.50
No. 1 bundles	19.50 to 20.00
No. 2 bundles	15.50 to 16.00
Mach. shop turn.	10.00 to 10.50
Short shov. turn.	16.00 to 16.50
Cast iron borings	16.00 to 16.50
Low phos.	20.50 to 21.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$11.00 to $11.50
No. 2 hvy. melting	10.00 to 10.50
No. 2 bundles	9.00 to 10.00
Mach. shop turn.	5.25 to 5.75
Mixed bor. turn.	4.75 to 5.25
Shoveling turnings	7.00 to 8.00
No. 1 machinery cast	18.50 to 19.50
Mixed yard cast.	17.50 to 18.50
Heavy breakable cast.	16.00 to 16.50
Charging box cast.	16.00 to 16.50
Unstrp. motor blks.	14.50 to 15.00
Cl'n cast chem. bor.	11.00 to 12.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.00 to $19.50
No. 2 hvy. melting	17.00 to 17.50
No. 1 bundles	17.00 to 17.50
No. 2 bundles	14.50 to 15.00
No. 1 busheling	17.00 to 17.50
Mach. shop turn.	10.00 to 10.50
Shoveling turn.	13.50 to 14.50
Cast iron borings	13.50 to 14.00
Mixed bor. and turn.	13.50 to 14.00
Cupola cast.	22.00 to 23.00
Mixed yard cast.	20.00 to 21.00
Stove plate	20.00 to 21.00
Small indus. malleable	18.00 to 19.00
Low phos. plate	19.50 to 20.50
Scrap rails	23.00 to 24.00
Rails 3 ft & under	30.00 to 31.00
RR. steel wheels	23.00 to 24.00
RR. coil & leaf spgs.	23.00 to 24.00
RR. knuckles & coup.	23.00 to 24.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$16.00 to $16.50
No. 2 hvy. melting	14.50 to 15.00
No. 1 bundles	16.00 to 16.50
No. 2 bundles	13.50 to 14.00
No. 1 busheling	16.00 to 16.50
Drop forge flashings	16.00 to 16.50
Mach. shop turn.	9.00 to 9.50
Shoveling turn.	14.00 to 14.50
Steel axle turn.	16.00 to 16.50
Cast iron borings	14.00 to 14.50
Mixed bor. & turn.	14.00 to 14.50
Low phos. 2 ft and under	16.50 to 17.00
No. 1 mach. cast.	26.50 to 27.00
Malleable	20.00 to 21.00
RR. cast.	26.50 to 27.50
Railroad grate bars	19.50 to 20.00
Stove plate	19.50 to 20.00
RR. hvy. melting	19.00 to 19.50
Rails 3 ft and under	25.00 to 26.00
Rails 18 in. and under	27.00 to 28.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bales	16.00
No. 2 bales	16.00
No. 3 bales	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	28.00
No. 1 cupola cast.	$20.00 to 25.00
RR. hvy. melting	20.00
Rails	23.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bales	16.00
No. 2 bales	16.00
No. 3 bales	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft under	30.00
No. 1 cupola cast.	$24.00 to 26.00
RR. hvy. melting	20.00

SEATTLE

Per gross ton delivered to consumer:

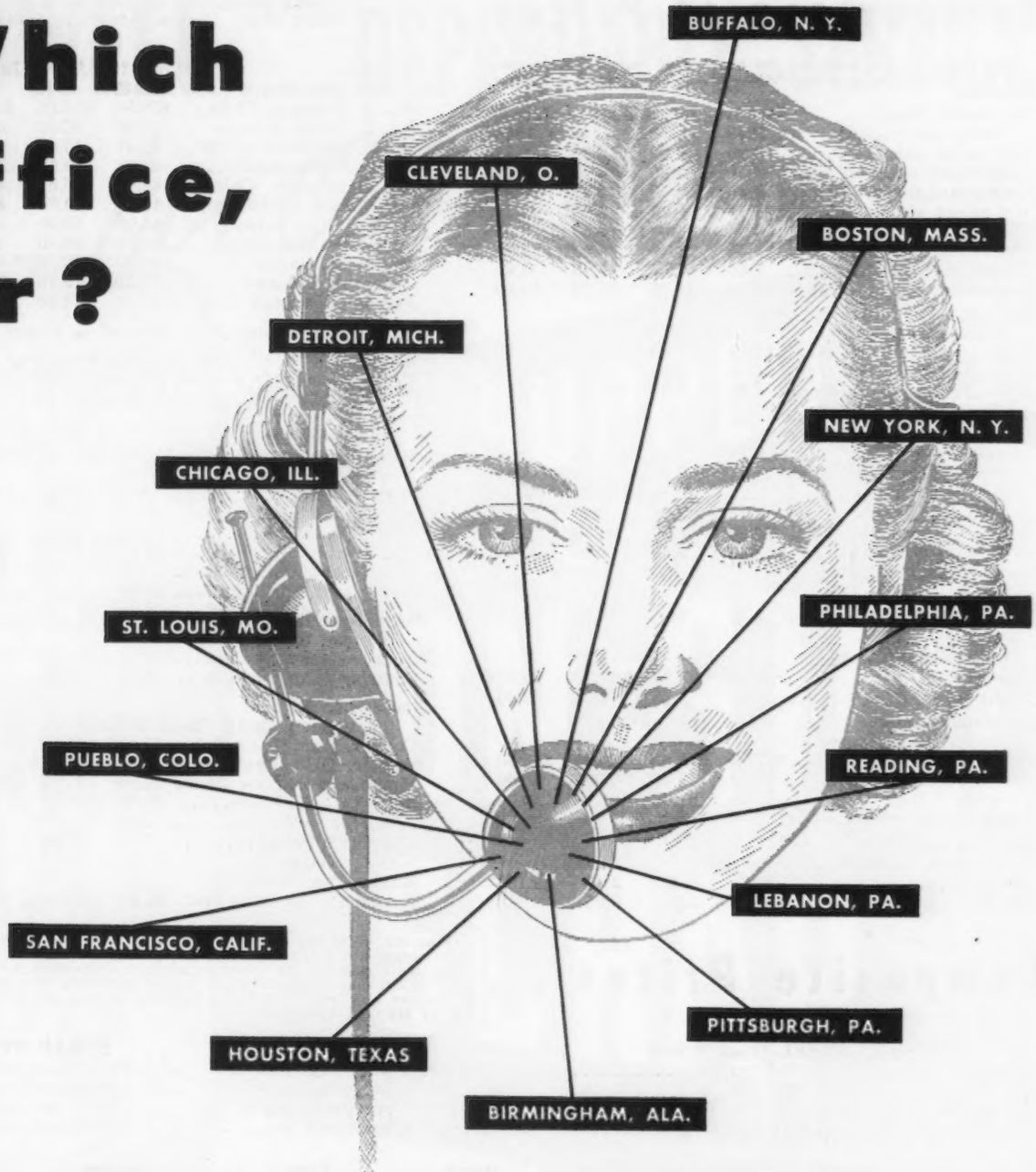
No. 1 & No. 2 hvy. melt.	$20.00
No. 1 & No. 2 bales	16.00
No. 3 bales	13.00
Elec. fur. 1 ft and under	22.00
No. 1 cupola cast.	$20.00 to 27.00
RR. hvy. melting	20.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast Grades f.o.b. shipping point:

Heavy melting	$21.00
No. 1 bundles	21.00
No. 2 bundles	20.50
Mechanical bundles	19.00
Mixed steel scrap	17.00
Mixed borings and turnings	15.00
Rails, remelting	21.00
Rails, rerolling	24.00
Bushelings	15.50
Bushelings, new fact, processed	19.00
Bushelings, new fact, unprocessed	14.00
Short steel turnings	15.00
Cast scrap	$25.00 to 26.00

Which office, sir?



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The expansion of our organization, with offices located in 15 major cities, is in accordance with our policy to give better service to our customers.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type: declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	July 12, 1949	July 5, 1949	June 14, 1949	July 13, 1948
Hot-rolled sheets	3.25	3.25	3.25	2.775
Cold-rolled sheets	4.00	4.00	4.00	3.495
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.913
Hot-rolled strip	3.25	3.25	3.25	2.775
Cold-rolled strip	4.038	4.038	4.038	3.535
Plates	3.40	3.40	3.40	2.93
Plates wrought iron	7.85	7.85	7.85	7.25
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.70
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	5.90
Special coated mfg. ternes	6.65	6.65	6.65	5.80
Bars and Shapes: (cents per pound)				
Merchant bars	3.35	3.35	3.35	2.875
Cold-finished bars	3.995	3.995	3.995	3.483
Alloy bars	3.75	3.75	3.75	3.213
Structural shapes	3.25	3.25	3.25	2.767
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	8.65
Wire: (cents per pound)				
Bright wire	4.15	4.15	4.15	3.608
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$2.725
Light rails	3.55	3.55	3.55	3.05
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$45.00
Slabs, rerolling	52.00	52.00	52.00	45.00
Forging billets	61.00	61.00	61.00	54.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.40	3.40	3.40	3.133
Skelp	3.25	3.25	3.25	2.888

Pig Iron: (per gross ton)	July 12, 1949	July 5, 1949	June 14, 1949	July 13, 1948
No. 2, foundry, Phila.	$50.56	$50.56	$50.56	$44.74
No. 2, Valley furnace	46.50	46.50	46.50	43.50
No. 2, Southern Cin'ti*	45.47	45.47	45.47	45.47
No. 2, Birmingham	39.38	39.38	39.38	39.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	43.00
Basic del'd Philadelphia*	49.74	49.74	49.74	44.24
Basic, Valley furnace	46.00	46.00	46.00	43.00
Malleable, Chicago†	46.50	46.50	46.50	43.50
Malleable, Valley	46.50	46.50	46.50	43.50
Charcoal, Chicago	73.78	73.78	73.78	65.55
Ferromanganese‡	173.40	173.40	173.40	145.00

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.
*Does not include interim increase on total freight charges, effective Jan. 11, 1949.

Scrap (per gross ton)				
Heavy melt'g steel, P'gh.	$20.75	$20.75	$22.50	$40.25
Heavy melt'g steel, Phila.	17.50	17.50	19.50	42.50
Heavy melt'g steel, Ch'go	19.75	19.75	20.75	40.25
No. 1, hy. comp. sh't Det.	12.75	12.75	15.75	36.25
Low phos. Young'n	21.25	21.25	22.25	45.25
No. 1, cast, Pittsburgh	26.50	26.50	26.50	63.75
No. 1, cast, Philadelphia	27.50	27.50	27.50	67.00
No. 1, cast, Chicago	31.00	29.50	28.88	70.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$13.75
Foundry coke, prompt	16.25	16.25	16.25	16.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	17.625	16.00	16.50	21.50
Copper, Lake Conn.	18.625	18.625	18.625	21.625
Tin, Grade A, New York	$1.03	$1.03	$1.03	$1.03
Zinc, East St. Louis	9.00	9.00	9.50	12.00
Lead, St. Louis	12.85	11.85	11.85	17.30
Aluminum, virgin	17.00	17.00	17.00	16.00
Nickel, electrolytic	42.93	42.93	42.93	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	35.00

Composite Prices . .

Starting with the issue of May 12, 1949 the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive, see p. 139 of May 12, 1949 issue.

	FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
July 12, 1949	3.705¢ per lb.	$45.91 per gross ton	$19.33 per gross ton
One week ago	3.705¢ per lb.	$45.91 per gross ton	$19.33 per gross ton
One month ago	3.705¢ per lb.	$45.91 per gross ton	$20.92 per gross ton
One year ago	3.211¢ per lb.	$41.84 per gross ton	$41.00 per gross ton

	HIGH		LOW		HIGH		LOW		HIGH		LOW	
1949	3.720¢	Jan. 1	3.705¢	May 3	$46.82	Jan. 4	$45.91	May 10	$43.00	Jan. 1	$19.33	June 28
1948	3.721¢	July 27	3.193¢	Jan. 1	46.91	Oct. 12	39.58	Jan. 6	43.16	July 27	39.75	Mar. 9
1947	3.193¢	July 29	2.848¢	Jan. 1	37.98	Dec. 30	30.14	Jan. 7	42.58	Oct. 28	29.50	May 20
1946	2.848¢	Dec. 31	2.464¢	Jan. 1	30.14	Dec. 10	25.37	Jan. 1	31.17	Dec. 24	19.17	Jan. 1
1945	2.464¢	May 29	2.396¢	Jan. 1	25.37	Oct. 23	23.61	Jan. 2	19.17	Jan. 2	18.92	May 22
1944	2.396¢		2.396¢		$23.61		$23.61		19.17	Jan. 11	15.76	Oct. 24
1943	2.396¢		2.396¢		23.61		23.61		$19.17		$19.17	
1942	2.396¢		2.396¢		23.61		23.61		19.17		19.17	
1941	2.396¢		2.396¢		$23.61	Mar. 20	$23.45	Jan. 2	$22.00	Jan. 7	$19.17	Apr. 10
1940	2.30467¢	Jan. 2	2.24107¢	Apr. 16	23.45	Dec. 23	22.61	Jan. 2	21.83	Dec. 30	16.04	Apr. 9
1939	2.35367¢	Jan. 3	2.26689¢	May 16	22.61	Sept. 19	20.61	Sept. 12	22.50	Oct. 3	14.08	May 16
1938	2.58414¢	Jan. 4	2.27207¢	Oct. 18	23.25	June 21	19.61	July 6	15.00	Nov. 22	11.00	June 7
1937	2.58414¢	Mar. 9	2.32263¢	Jan. 4	23.25	Mar. 9	20.25	Feb. 16	21.92	Mar. 30	12.67	June 9
1936	2.32263¢	Dec. 28	2.05200¢	Mar. 10	19.74	Nov. 24	18.73	Aug. 11	17.75	Dec. 21	12.67	June 8
1935	2.07642¢	Oct. 1	2.06492¢	Jan. 8	18.84	Nov. 5	17.83	May 14	13.42	Dec. 10	10.33	Apr. 29
1934	2.15367¢	Apr. 24	1.95757¢	Jan. 2	17.90	May 1	16.90	Jan. 27	13.00	Mar. 13	9.50	Sept. 25
1933	1.95578¢	Oct. 3	1.75836¢	May 2	16.90	Dec. 5	13.56	Jan. 3	12.25	Aug. 8	6.75	Jan. 3
1932	1.89196¢	July 5	1.83901¢	Mar. 1	14.81	Jan. 5	13.56	Dec. 6	8.50	Jan. 12	6.43	July 5
1931	1.99626¢	Jan. 13	1.86586¢	Dec. 29	15.90	Jan. 6	14.79	Dec. 15	11.33	Jan. 6	8.50	Dec. 29
1929	2.31773¢	May 28	2.26498¢	Oct. 29	18.71	May 14	18.21	Dec. 17	17.58	Jan. 29	14.08	Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Widths up to 12-in. inclusive. (2) 0.25 carbon and less. (3) Cokes, 1.25 lb, deduct 25¢ per base box. (4) 18 gage and heavier. (5) For straight length material only from producers to fabricators. (6) Also shafting. For quantities of 40,000 lb and over. (7) Carload lot in manufacturing trade. (8) Hollowware enameling, gages 29 to 31 only. (9) Produced to dimensional tolerances in AISI Manual Sec. 6. (10) Slab prices subject to negotiation in most cases. (11) San Francisco only. (12) Los Angeles only. (13) San Francisco and Los Angeles only. (14) Seattle only. (15) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas														
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		Detroit	Johnstown	Seattle, S. Frisco, LosAngeles	Fontana
INGOTS Carbon forging	$50.00											$50.00			
Alloy	$51.00						(per net ton)					$51.00			
BILLETS, BLOOMS, SLABS Carbon, rerolling[10]	$52.00				$52.00	$52.00	(per net ton)						$52.00		$71.00
Carbon forging billets	$61.00	$61.00	$61.00	$61.00	$61.00	$61.00	(per net ton)					$61.00	$61.00		$80.00
Alloy	$63.00	$63.00				$63.00	(Bethlehem, Canton, Massillon = $63.00) (per net ton)					$63.00			$82.00
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40	3.40		3.40	3.40		3.40	3.50			Worcester 3.70		3.40	4.05[11] 4.20[12]	
SHEETS Hot-rolled[4]	3.25	3.25	3.25	3.25	3.25	3.25 (Conshohocken,	3.25 Pa. 3.35)	3.25		Warren, Ashland = 3.25		3.45		3.95[13]	4.15
Cold-rolled	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95	4.90
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton =4.40	4.40	Ashland =4.40			5.15[13]	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes (10 gage)	4.80		4.80							4.80					
STRIP Hot-rolled[1]	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	4.40
Cold-rolled[2]	4.00	4.15		4.00		4.00	4.00	4.00		New Haven 4.50 Warren = 4.00 to 4.25		4.20 to 4.25			4.90
TINPLATE Cokes, 1.50 lb.[3] base box	$7.75	$7.75	$7.75		$7.85			$7.85	$7.95	Warren, Ohio =$7.75				Pittsburg, Cal. =$8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct $1.10 from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct $2.00 from 1.50 lb. coke base box price														
BLACKPLATE, h.e., 29 ga.[8]	5.30	5.30	5.30					5.40		Warren, Ohio =5.30					
BARS Carbon Steel	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton =3.35	3.55	3.35	4.05	4.00
Reinforcing[5]	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton =3.35		3.35	4.05 to 4.10	4.00
Cold-finished[6]	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75	Bethlehem, Canton, Massillon =3.75				4.05	3.75	4.80[12]	4.75
Alloy cold-drawn	4.65	4.65	4.65	4.65		4.65	4.65	Massillon =4.65			Worcester 4.95				
PLATE Carbon steel[9]	3.40	3.40	3.40	3.40	3.40 Cons	3.40 hohocken	3.40 =3.50	3.40 Coatesville =3.50, Claymont =3.50 Geneva =3.40, Harrisburg =3.50				3.65	3.40	4.30[14]	4.00
Floor plates	4.55	4.55		4.55				Conshohocken =4.55							
Alloy	4.40	4.40							Coatesville =4.50						
SHAPES, Structural	3.25	3.25	3.25		3.25	3.30	Bethlehem =3.30, Geneva, Utah =3.25						3.30	3.80 to 3.90[14]	3.80
MANUFACTURERS' WIRE[7] Bright	4.15	4.15		4.15	4.15		4.15	4.25	Duluth =4.15, Worcester =4.45				4.15	5.15[11]	
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester =5.50 New Haven, Trenton =5.50				5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel							Straight Chromium		
	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	15.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	36.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.80	34.00	50.50	39.50	44.00	26.00	26.50–27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium ..... 52¢
Oil hardened manganese ..... 29¢
Special carbon ..... 26.5¢
Extra carbon ..... 22¢
Regular carbon ..... 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60
Transformer 58	9.30
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb ..... $3.20†
Joint bars, 100 lb 4.25
Light rails per 100 lb 3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburg, Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢
†CF&I, $3.30.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon ..... 4.00¢
0.41 to 0.60 carbon ..... 5.50¢
0.61 to 0.80 carbon ..... 6.10¢
0.81 to 1.05 carbon ..... 8.05¢
1.06 to 1.35 carbon ..... 10.35¢
Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct,		
Coatesville, Pa.	*26.50	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-carbon		
10 pct, Coatesville	27.50	
Inconel-carbon		
10 pct, Coatesville	36.00	
Monel-carbon		
10 pct, Coatesville	29.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa.		75.00
Aluminized steel sheets		
Hot dip, Butler, Pa.		7.75

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	123
Galvanized nails*	103	123
Woven wire fence†	109	132
Fence posts, carloads††	114	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic Sharon*	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Sharon*
Plates	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5.45
Sheets									
Hot-rolled	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.95	5.15
Cold-rolled	6.05	6.05	6.05	.....	6.05	6.05	6.05	6.05	6.25
Galvanized	.....	6.75	.....	.....	.....	6.75	.....	.....	.....
Strip									
Hot-rolled	4.95	4.95	4.95	.....	4.95	4.95	4.95	4.95	5.15
Cold-rolled	.....	.....	6.05	.....	.....	6.05	6.05	6.05	6.25
Shapes	.....	4.95	.....	.....	4.95	5.05	4.95	4.95	.....
Beams	.....	4.95	.....	.....	.....	.....	.....	.....	.....
Bars									
Hot-rolled	5.10	5.10	5.10	.....	5.10	5.10	5.10	5.10	5.30
Bar shapes	.....	5.10	.....	.....	5.10	5.10	5.10	5.10	.....

* Sheets and strip.

PIPE AND TUBING

Base discounts, f.o.b. mills, Base price, about $200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, buttweld*	Black	Galv.
½-in.	43 to 41	26½ to 24½
¾-in.	46 to 44	30½ to 28½
1-in.	48½ to 46½	33½ to 31½
1¼-in.	49 to 47	34 to 32
1½-in.	49½ to 47½	34½ to 32½
2-in.	50 to 48	35 to 33
2½ to 3-in.	50½ to 48½	35½ to 33½
Steel, lapweld		
2-in.	39½	26 to 24
2½ to 3-in.	43½ to 42½	28 to 27
3½ to 6-in.	46½ to 42½	31 to 27
Steel, seamless		
2-in.	38½ to 27	23 to 11½
2½ to 3-in.	41½ to 32½	26 to 17
3½ to 6-in.	43½ to 38½	28 to 23
Wrought Iron, buttweld		
½-in.	+20½	+47
¾-in.	+10½	+36
1 & 1¼ in.	+ 4½	+27
2-in.	— 1½	+23½
3-in.	— 2	+23
Wrought Iron, lapweld		
2-in.	+ 7½	+31
2½ to 3½-in.	+ 5	+26½
4-in.	list	+20½
4½ to 8-in.	+ 2	+22

EXTRA STRONG, PLAIN ENDS

Steel, buttweld		
½-in.	42 to 40	27 to 25
¾-in.	46 to 44	31 to 29
1-in.	48 to 46	34 to 32
1¼-in.	48½ to 46½	34½ to 32½
1½-in.	49 to 47	35 to 33
2-in.	49½ to 47½	35½ to 34½
2½ to 3-in.	50 to 48	36 to 34
Steel, lapweld		
2-in.	39½ to 38½	25 to 24
2½ to 3-in.	44½ to 42½	30 to 28
3½ to 6-in.	48 to 44	33½ to 31½
Steel, seamless		
2-in.	37½ to 32½	23 to 18
2½ to 3-in.	41½ to 36½	27 to 23
3½ to 6-in.	45	30½
Wrought Iron, buttweld		
½-in.	+16	+40
¾-in.	+ 9½	+34
1 to 2-in.	— 1½	+23
Wrought Iron, lapweld		
2-in.	+ 4½	+27½
2½ to 4-in.	— 5	+16
4½ to 6-in.	— 1	+20½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. *Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$19.18	$22.56	$18.60	$21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago $95.70
6 to 24-in., del'd N. Y. ..... $92.50 to 97.40
6 to 24-in., Birmingham 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less 109.30

Class "A" and gas pipe, $5 extra: 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. shorter	34
All diam., longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
½ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)
Pct off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

Effective CaF, Content:	Base price per net ton
70% or more	$37.00
60% or less	34.00

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports)*

	Per gross Ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	27.00¢
Antimony	53.73¢
Brass, 10 ton lots	20.50 to 23.50¢
Copper, electrolytic	27.75¢
Copper, reduced	27.625¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$3.50
Lead	18.50¢
Manganese	48.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	66.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.00¢
Tin	$1.15 to $1.25
Tungsten, 99%	$2.90
Zinc, 10 ton lots	11.75 to 16.25¢

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$22.95
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Plainesville, Ohio, f.o.b.	20.90
Erie, del'd	$21.50 to 23.50
Cleveland, del'd	22.45
Cincinnati, del'd	21.50
St. Paul, f.o.b.	23.50
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
First quality, Pa., Ky., Mo., Ill. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	$85.00 to 95.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	$14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	Per Net Ton
Standard chemically bonded, Balt., Chester	$69.00
Magnesite Brick	
Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	*Std. ⅜-in. grains*
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.00 to 56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢: Missouri Valley, add 20¢	$12.25

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 15¢ to base price except Cincinnati and New Orleans (*). add 10¢; New York, add 20¢.)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21-6.41	6.95-7.11	5.37	....	5.56	5.36	5.42	6.16	....	9.60-10.10	....	....
Birmingham	5.00	....	6.40	5.00		5.15	5.00	5.10	6.57	....	....	....	....
Boston	5.55	6.45-6.75	7.11-7.61	5.60-5.95	6.75	5.80	5.42	5.52	6.27	9.67-9.79	10.04-10.07	11.23	11.47
Buffalo	4.85	5.75	7.42-7.57	5.24	7.27	5.35	5.00	4.95-	5.40	9.30-	9.60	10.65	10.95
Chicago	4.85	5.75	6.95-7.10	4.85	5.55-6.68	5.10	4.90	4.90	5.40	8.90	9.26	10.25	10.55
Cincinnati*	5.16-5.51	5.84-6.28	6.59-6.93	5.28-5.43	....	5.53-5.85	5.33	5.33-5.48	6.08-6.20	9.74	9.99	11.19	11.44
Cleveland	4.85	5.75	6.70	5.03	....	5.21	5.01	5.01	5.45	9.05	9.35	10.40	10.70
Detroit	5.28-5.32	6.07-6.18	7.38-7.58	5.27-5.47	6.27-6.58	5.52-5.57	5.33-5.40	5.33-5.55	6.00-6.10	9.67	9.92	11.11	11.35
Houston	6.70-6.95	....	7.30	6.70	....	6.70	6.20-6.70	6.40-6.65	7.60	10.15	10.40	11.45	11.70
Indianapolis	5.29	6.13	7.44	5.29	7.36	5.54	5.34	5.34	6.14	11.25	11.30	....	....
Los Angeles	6.45	....	8.05	6.65	8.35[5]	6.15	5.95	6.10	7.95[14]	10.95[15]	10.90[15]	12.45[15]	12.70[15]
Memphis	5.75-5.80	7.90 6.80	7.20	5.80-5.95	6.80	5.95-6.00	5.75	5.75	6.53	....	....	....	....
Milwaukee	5.03	5.93	7.13-7.18	5.03-5.38	6.86	5.28	5.08	5.08	5.63	9.53	9.73	10.98	11.23
New Orleans*	5.95	6.75	....	6.15	....	6.15	5.95	5.95	6.65[6]	....	....	....	....
New York	5.40	6.31	6.90	5.62	....	5.70	5.33	5.57	6.36	9.28	9.58	11.18	11.43
Norfolk	6.00	....	....	6.20	....	6.05	6.05	6.05	7.05	....	....	....	....
Omaha	6.13	....	8.33	6.13	....	6.38	6.18	6.18	6.98	....	....	....	....
Philadelphia	5.05	6.24[13]	6.58	5.40	6.29	5.35	5.10	5.40	5.94	9.05	9.35	10.62	10.87
Pittsburgh	.85	5.75	6.90	5.00	6.00	5.05	4.90	4.90	5.40	8.90	9.20	10.25	10.55
Portland	6.50[8]-6.90	8.00	8.80-9.10	6.85[8]	....	6.30[8]	6.35[8]	6.35[8]	8.25[14]	10.50[6]	10.10[6]	....	....
Salt Lake City	7.25[3]	8.20	8.80-9.30	7.65[3]	....	6.10[3]	5.70[3]	6.95[8]	8.30	....	....	....	....
San Francisco	6.15[8]-7.15	7.50[3]	7.90	6.75[8]	8.25[5]	6.30-6.35[8]	5.90[8]	5.90[8]	7.55	10.90[15]	10.85[15]	12.40[15]	12.65[15]
Seattle	6.70[4]-7.10	8.15[2]-8.65	8.80 9.30	6.70[4]	....	6.35[4]	6.30[4]	6.20[4]	8.15[14]	....	10.35[15]	....	13.10[15]
St. Louis	5.22-5.37	6.12-6.27	7.32	5.22	6.68-7.54	5.47	5.27	5.27	5.82	9.27-9.72	9.57-9.97	10.62-11.17	10.92-11.42
St. Paul	5.44	6.19-6.34	7.54-7.64	5.44	6.82	5.64-6.69	5.49	5.49	6.04	9.49	9.79	10.84	11.14

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:
Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:
Sheets, 400 to 1499 lb strip, extras on all quantities. Bars 1000 lb and over.

ALLOY BARS:
1000 to 1999 lb.

GALVANIZED SHEETS:
450 to 1499 lb.

EXCEPTIONS:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone (5 pct Southern Zone, 4 pct Western Zone), effective Jan. 11, 1949.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	.....	.....	.....	.....
Birmingham	38.88	39.38	.....	.....	.....
Buffalo	46.00	46.50	47.00	.....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	50.00	50.50	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	.....	.....	.....
Lone Star, Texas	46.00	46.50†	.....	.....	.....
Neville Island	46.00	46.50	46.50	.....	.....
Geneva, Utah	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	48.00	48.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	48.00	48.50	49.00	.....	54.00
Youngstown	46.00	46.50	46.50	.....	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	50.00	50.50	.....	.....
Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Brooklyn	Steelton	5.48	.....	53.98	54.48	54.98	59.48
Cincinnati	Birmingham	6.09	44.97	45.47	.....	.....	.....
Jersey City	Steelton	3.67	.....	52.17	52.67	53.17	57.67
Los Angeles	Geneva-Ironton	7.13	53.13	53.63	.....	.....	.....
Mansfield	Cleveland-Toledo	3.03	49.93	49.53	49.53	50.03	54.03
Philadelphia	Bethlehem	2.17	50.17	.....	.....	.....	.....
Philadelphia	Swedeland	1.31	49.31	49.81	50.31	50.81	.....
Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
San Francisco	Geneva-Ironton	7.13	53.13-	53.63-	.....	.....	.....
Seattle	Geneva-Ironton	7.13	53.13-	53.63-	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Gulf Ports	Lone Star, Texas	.....	50.50	51.00†			

† Low Phos., Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $66.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $73.78. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham $174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont. $172
F.o.b. Johnstown, Pa. $174
F.o.b. Sheridan, Pa. $172
F.o.b. Etna, Pa. $175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk 10.45
Ton lots 12.05
Less ton lots 12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed 35.5
Ton lots 37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads 28
Ton lots 30
Less ton lots 32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C,	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk 8.95
Ton lots 10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet 10.30
Ton lots 11.90
Less ton lots 12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, $80.00; $78.50 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe 20.70
97% Si, 1% Fe 21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk 6.30
Ton lots 7.90
Less ton lots 8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si 18.50
50% Si 11.30
75% Si 13.50
85% Si 14.65
90-95% Si 16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C 28.75
0.10% C 28.25
0.15% C 28.00
0.20% C 27.75
0.50% C 27.50
1.00% C 27.25
2.00% C 27.00
65-69% Cr, 4-9% C 20.50
62-66% Cr, 4-6% C, 6-9% Si 21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload bulk 13.75
Ton lots 15.25
Less ton lots 16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads 21.60
Ton lots 23.75
Less ton lots 25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads 27.75
Ton lots 30.05
Less ton lots 31.85

Chromium Metal

Contract prices, cents per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C 1.09
0.50% max. C 1.05
9.00% min. C 1.04

Calcium—Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads 17.90
Ton lots 21.00
Less ton lots 22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads 19.25
Ton lots 21.55
Less ton lots 22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots 19.75
Less ton lots 21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots ..... 15.75¢
Less ton lots ..... 17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%.

Carload packed ..... 17.00¢
Ton lots to carload packed ..... 18.00¢
Less ton lots ..... 19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots 17.25
Less ton lots 18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered $2.25

Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.

Openhearth $2.90
Crucible 3.00
High speed steel (Primos) ... 3.10

Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.20

Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.

Ton lots $2.90
Less ton lots 2.95

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.10

Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo. ..... 96¢

Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per pound contained Mo. ..... 95¢

Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti $1.28

Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N.Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti $1.40
Less ton lots 1.45

Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton $160.00

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload 75.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.

Carload, bulk ..... 6.60¢

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carload ..... 7.40¢
Ton lots ..... 8.80¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Carload, bulk ..... 11.00¢
Ton lots, packed ..... 11.25¢
Less ton lots ..... 11.75¢

Boron Agents

Contract prices per lb. of alloy, del.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lot $1.20
F.o.b. Wash., Pa.; 100 lb and over

10 to 14% B. ..... .75
14 to 19% B. 1.20
19% min. B. 1.50

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.

Ton lots $1.67
Less ton lots 1.79

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.

Less ton lots $1.80

Silcaz, contract basis, delivered

Ton lots ..... 45.00¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.

No. 1 ..... 93¢
No. 6 ..... 63¢
No. 79 ..... 45¢

Bortam, f.o.b. Niagara Falls

Ton lots, per pound ..... 45¢
Less ton lots, per pound ..... 50¢

Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.

Ton lots, per pound ..... 8.625¢

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B $6.25